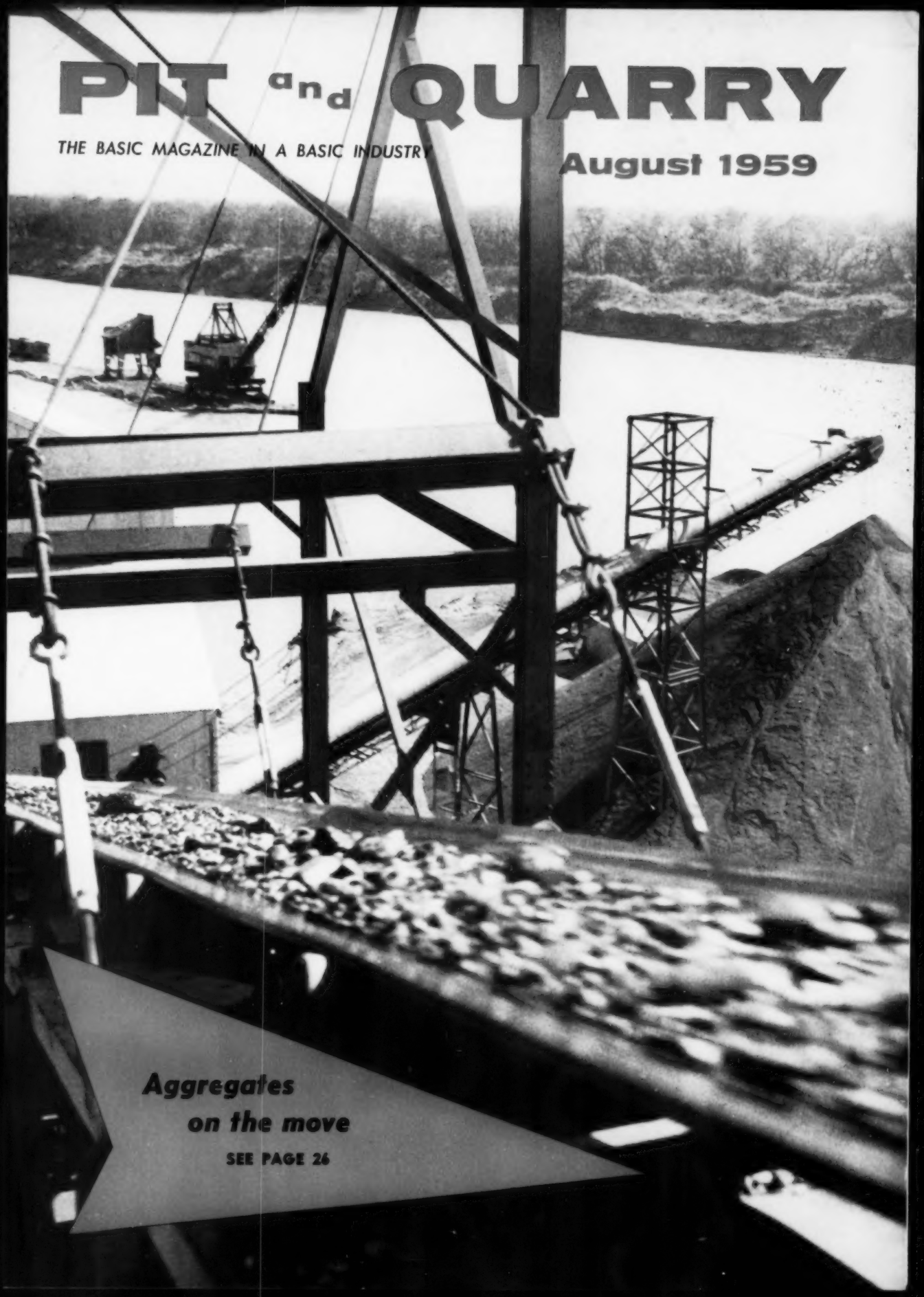
PIT and QUARRY

THE BASIC MAGAZINE IN A BASIC INDUSTRY

August 1959



Aggregates on the move

SEE PAGE 26

Any screen won't do—specify Ludlow-Saylor! While sharply competitive in price, L-S Screens give you tougher resistance to abrasion, distortion, fatigue—last up to twice as long—promise these other important advantages:

- do a more accurate sizing job—insure uniformly higher quality products
- give more efficient separation on the first pass—cut plant-clogging re-circulating loads to minimum
- step up feed and increase output compared to the sluggish movement of materials across improperly woven screens
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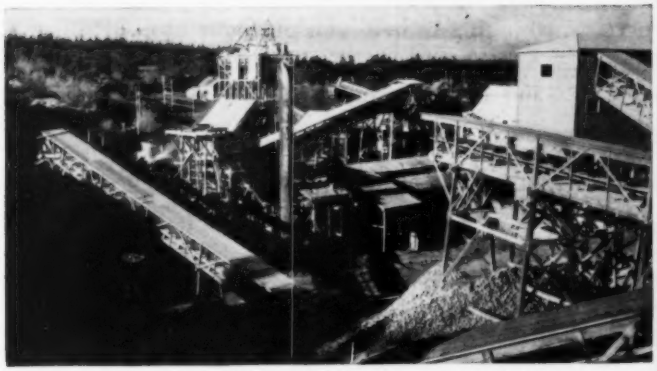
Rocks make the rounds

on LINK-BELT belt conveyors



MAKING THE GRADE FROM TRUCK TO BARGE — 9 Link-Belt belt conveyors plus Link-Belt screening equipment perform all sizing and conveying operations at Blubber Bay. This is typical of many sand, gravel or stone operations where Link-Belt conveyors perform this overall function—process, store and reclaim the material . . . carry it to rail or dockside.

Conveyorization is key to modernization of this Blubber Bay (B. C.) lime rock plant

When Gypsum, Lime and Alabastine, Canada, Limited purchased the Blubber Bay property and plant of the Pacific Lime Company, they decided it was time for extensive improvements. Working with Swan, Wooster and Partners, consulting engineers, they called in Link-Belt to supply a system of belt conveyors that would carry rock through screening and stockpiling operations for maximum production.

More and more firms are relying on Link-Belt. Here's an experienced engineering organization that will follow through from start to finish—the designing, manufacturing, erecting of conveyor systems . . . large or small. And nowhere can you match Link-Belt's combination of application experience . . . complete line of quality components . . . expert coordination of related equipment.

Get all the facts from your Link-Belt representative. Link-Belt engineers will be glad to work with you and your consultants—help you get the finest in belt conveyors.

LINK-BELT

15,132

BELT CONVEYING EQUIPMENT

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VIBRATING SCREENS

PIT and QUARRY

AUGUST 1959
VOL. 52 NO. 2

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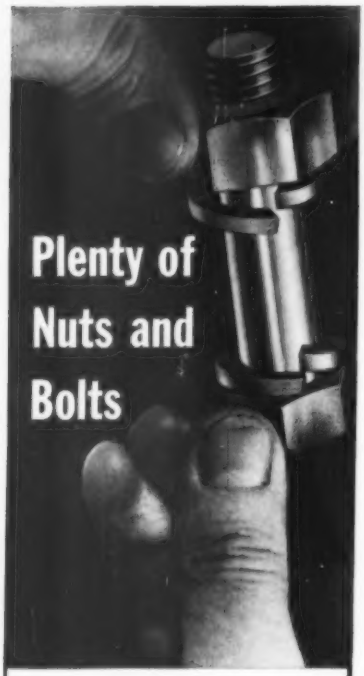

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30 YEARS OF SERVICE and still going strong!

◆ The picture above shows an old veteran Model 5 Northwest bought 30 years ago by the Blue Diamond Corporation of Los Angeles, Calif. Beside it is a new Model 6, the ninth Northwest bought by this well-known California supply dealer.

Thirty years is a long time and it is not through yet. When the Model 6 takes over, the old machine is to be mounted on concrete and is expected to give *10 years more service.* We built 'em tough in those days—but they are tougher today.

Go through the whole Northwest Machine—any model from the big 95 to the Model 25-D! Booms!—sturdier for workhorse lifting—Uniform Pressure Swing Clutches for smooth swinging, and accurate spotting...cool running, trouble-free!—the "Feather-Touch" Clutch Control with the "feel-of-the-load", free of the complication of delicate mechanisms, valves, pumps and compressors,—a choice of Boom Hoists including the Northwest Independent High Speed Boom Hoist, a rugged unit capable of trouble-free service in hour-after-hour operation—a wide range of other equipment including Pivoted Gantries, Removable Counterweight, Sectional Boom Hoist Rigging and Pendant Lines, Telescopic Boom Struts, Adjustable Jibs, extended Boom Point Sheave Shafts, and 3rd Drums that make possible three load lines.

Add to this that Northwest quality of "always being ready to go." *We hear it everywhere and Northwest users will tell you so.* It's the big reason why Northwests are money makers.

NORTHWEST ENGINEERING COMPANY
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Mr. Charles D. Johnson operator of the new Model 6 was formerly the operator of the old Model 5. He says, "I have been a crane operator for Blue Diamond Corporation for five years and formerly operated their 30 year old Model 5 Northwest. What I like best about the new Model 6 is the "Feather-Touch" Controls. Still, maybe the brakes are the best feature—so smooth and soft. Another thing I like is the Murphy engine—it supplies plenty of power. You can't bog it down—I've tried!"

NORTHWEST Always Ready to GO

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
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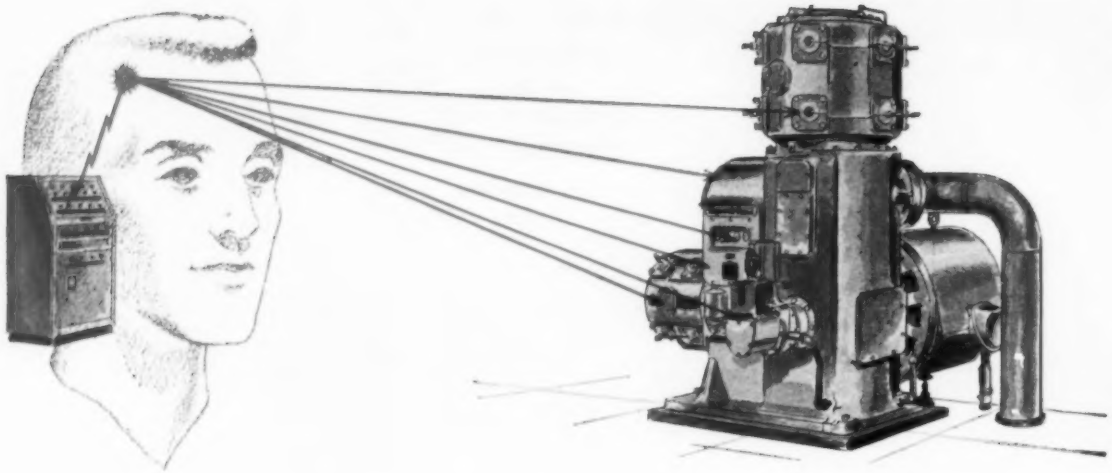
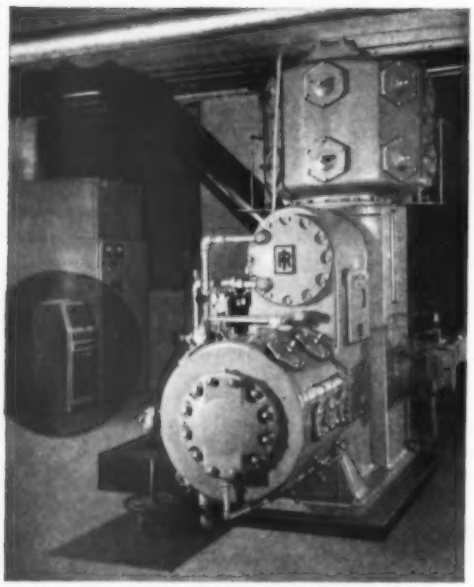


Making a Compressor "Think for Itself"

New 'Tendamatic control brings automatic supervision to the COMPRESSOR PLANT



'Tendamatic control of this Ingersoll-Rand type XLE two-stage heavy-duty air compressor assures maximum protection of capital investment, maximum manpower utilization, continuity of production and lower maintenance expense.

INGERSOLL-RAND's new *'Tendamatic* control is like a *tireless attendant,* who keeps checking the operation of your compressor every second.

All you need to do is push the start button; the 'Tendamatic does everything from then on. Its built-in safeguards eliminate routine inspection and supervision, detect trouble before it can do any harm to the compressor, and put all maintenance on a low-cost *preventive* basis.

This completely automatic control system keeps an eye on air pressure and temperatures . . . lubricating oil pressure and temperature . . . the cylinder lubricator . . . and the float level in the condensate trap. It watches for leaking valves and mechanical failure of running parts.

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'Tendamatic control is available only on Ingersoll-Rand air and gas compressors

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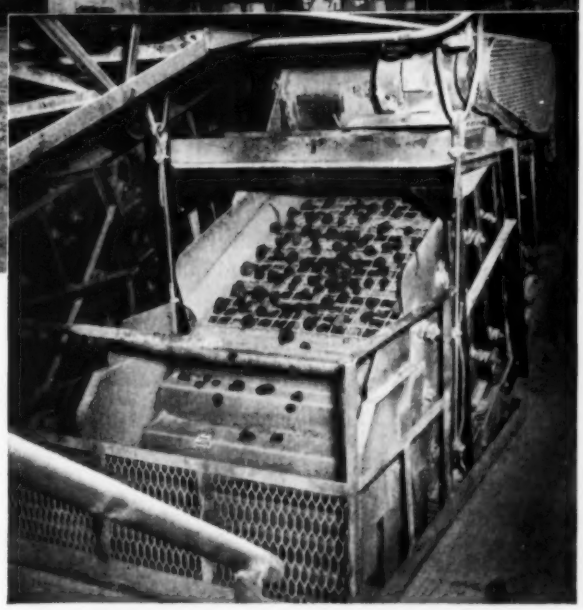

3 new Deister Screens at National Lime's New Buckland Plant

At Buckland, Ohio, The National Lime and Stone Company's new plant has just completed its first year of operation. It is one of the most modern and efficient plants of its size in the country.

Expert plant engineering enables this versatile plant to produce any combination of sizes from three inches down to ag-lime. To meet peak demands, an unusual combination of split chutes permits maximum recirculation of material for secondary processing.

All three screens installed in the new plant are Deister Vibrating Screens. The Number 1 screen—a Deister type UHS, triple deck 4′ x 10′—takes the entire load from the primary crusher. It is equipped with 3-inch, 1 3/4-inch and 7/8-inch wirecloth. Secondary screening is handled by a Deister type UHS triple deck 4′ x 12′, equipped with 1-inch, 7/16-inch and 3/16-inch wirecloth.

A high-speed type USL Deister Ag-Lime screen can produce up to 25 tph when required.

The know-how accumulated by one of the nation's oldest and largest continuous producers has been demonstrated in the design of this plant. Probably that is why superintendent Earl Adams can say, "When the plant opened, we pushed the button . . . and everything worked perfectly. We've been doing the same thing everyday . . . with no breakdowns. No screen adjustment has been necessary on our Deister machines."

Deister Type UHS triple deck 4′ x 10′ number one screen in National Lime and Stone Company's new Buckland, Ohio plant.

Remember, Deister's exclusive Opposed Elliptical Throw assures closer separation . . . higher capacity. Deister's Lifetime Unitized Vibrating Mechanism, featuring Oil Mist Lubrication and extremely rugged construction, assures steady, dependable performance.

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Tunnels of Armco Liner Plate are widely used under storage bins or piles. The corrugated metal design gives maximum strength with minimum weight. Gate openings can be provided simply by leaving out plates where desired. Circular structures are available in diameters from 4 to 15 feet in 2-inch increments.

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The manual "Armco Liner Plate," will give you complete details. Just fill out and send the coupon below.

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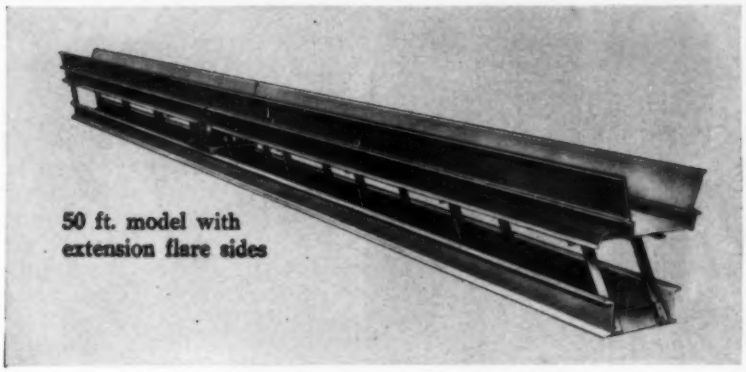
SYNTRON

MECHANICAL

VIBRATING CONVEYORS



50 ft. model with extension flare sides

lower bulk material handling cost

SYNTRON Mechanical Vibrating Conveyors are multi-purpose units designed for high speed conveying of bulk materials—with modifications their uses are virtually unlimited. They can be used as single units—multiple sections in tandem—combination screen and conveyor for scalping, sizing, dewatering and with heated troughs for drying, pre-heating, etc.

Each unit consists of two equal length troughs independently mounted on a common base. Motor driven eccentric and drive rod operates each section providing a powerful vibrating action that moves large volumes of material in a uniform, continuous flow.

SYNTRON Mechanical Vibrating Conveyors are available in lengths to meet most requirements. They are easy to install and operate.

Low operating and maintenance expenses keep material handling cost down.

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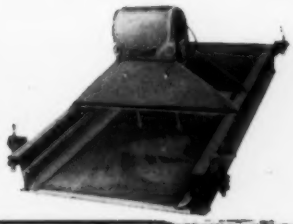
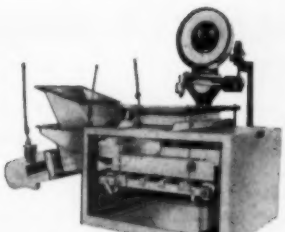


VIBRATING SCREENS

DRY FEEDER MACHINES

ROTARY VIBRATOR CAR SHAKERS



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TEST SIEVE SHAKERS

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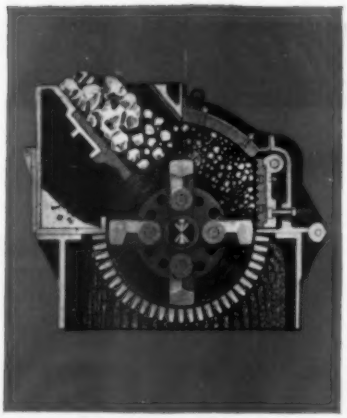
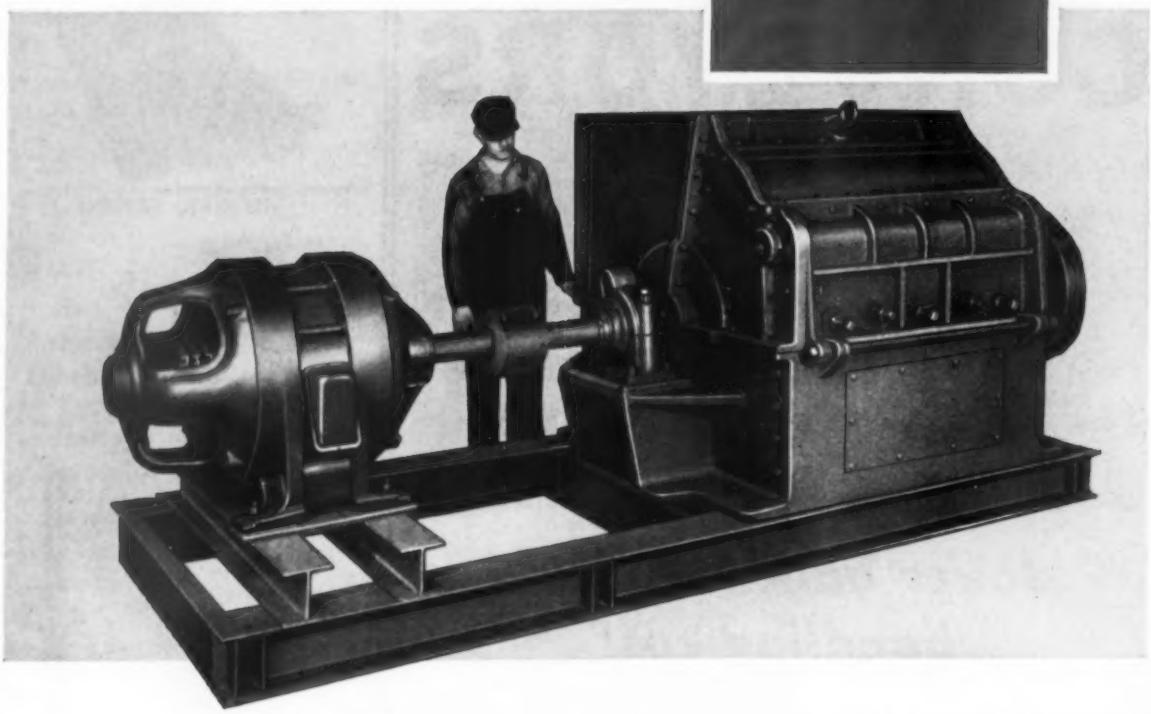
Complete size reduction.... from start to finished product... in a single Williams Hammer Mill





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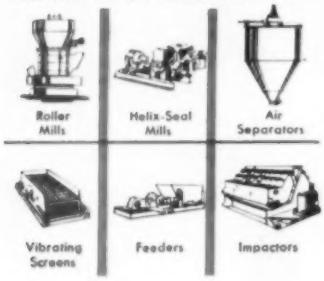

In all normal crushing operations, a Williams heavy duty hammer mill can take most material and, *in a single pass*, reduce it to finished size! Production economies alone, in labor, power, maintenance, as well as stepped up output of better quality and more uniform products, will *cut costs up to 50%*.

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Williams hammer mills are built for daily rough and rugged service. Extra heavy manganese steel liners and breaker plates, oversize shafts, massive parts and reinforcements, all defy shock and wear, reduce downtime and replacements to nil.

If the cost price squeeze is one of your problems, get the facts about Williams hammer mills. *Write now for catalog.*

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CRUSHERS GRINDERS SHREDDERS

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802 ST. LOUIS AVE. St. Louis 6, Mo.

Oldest and Largest Manufacturers of Hammer Mills in the World

Washington News Letter

By S. HERBERT UNTERBERGER

THE RECORD of the first session of the 86th Congress reveals that, despite their substantial majorities, the Democrats have lost the offensive, if, indeed, they ever held it.

Elected at a time when the economic recession was deepening, and no one knew whether it would develop into a full-scale depression, the Democratic members of Congress very naturally based their proposed actions on a program of expansionist, anti-depression measures. But the unexpectedly rapid economic recovery left them almost literally speechless. And, as a group, they have not shown the capacity for rapid adaptation to changed conditions required of politicians who manage to maintain continuous control.

Although they are unlikely to acknowledge it publicly, most of the Democrats approached this session of Congress convinced that the old Rooseveltian spending formula was all that was needed to assure success and to earn the eternal gratitude of their constituencies. But, unlike that halcyon era when the Democratic majorities in the Congress and the Democratic president saw eye to eye on the "spend and spend, elect and elect" formula so forthrightly articulated by the late Harry Hopkins, in the current situation there is a Republican president in the White House who is dedicated more strongly to governmental economy than to any other principle. This fact set up the underlying conditions for a test of strength in which the Democrats in Congress are now coming out second-best.

The most shattering experience to the Democratic spenders has been the realization that the very people who elected them have changed their minds about the necessity for increased spending in large amounts. Here they were, all ready to deliver on their campaign promises, only to find that their constituencies were far from sure that they wanted delivery. This is enough to drive some lawmakers directly into the hands of the psychiatrists.

As this session of Congress wore on, instead of fighting the President on the economy issue, the Democrats in Congress have been trying to compete with him for leadership on it. In this effort they were doomed to failure. While probably all the Democrats in Congress now realize their general predicament, not all have changed their positions to the same degree, so that in their new posture they present anything but a united front.

A few Democrats, who represent the remaining depressed automobile manufacturing areas, are even continuing to push for economic stimulation, regardless of the possible inflationary consequences. At the other extreme, some have openly changed their positions; but most of them are "in-between," still on record in favor of larger expenditures, but not sure that they really want them to pass.

In their early enthusiasm, the Democrats took through the Senate a bill designed to stimulate new industrial activity in communities hard hit economically. The bill would have provided for more than 250 million dollars in loans and grants. This amount was known to be many times what the President would approve. This measure has been bottled up in the House Rules Committee ever since, with virtually no chance of being released. Even if it were to pass, it would be sure to draw a Presidential veto which could not be overridden.

About the same time, the Senate passed a $465,000,000 program of federal grants for airport construction. The House scaled this down to $297,000,000, but before the President approved it, it was down to a two-year $126,000,000 program.

Urban renewal and public housing legislation went through similar stages, but the end result did not meet the President's standard, thereby risking his veto.

Education, which looked as though it were going to be the costliest of all programs, did not even get out of committee in either the Senate or the House. As a result, nothing is expected to happen in this area in this session of Congress.

This leaves the Democrats with practically no record of achievement to cite,—and only one year to go before the Presidential campaign.

It is generally agreed in Washington that there are only two significant areas left in which the Democrats can make an important record—civil rights and labor reform legislation. In neither of these areas do the Democrats have a brilliant record.

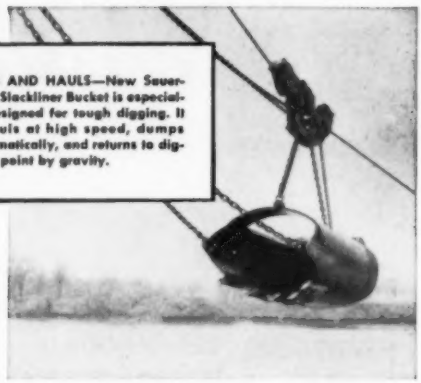
Because the solid South has, for so long, been the keystone of Democratic strength, civil rights has been a subject which the Democrats have tried to avoid. The situation is the same today. Although Mr. Truman demonstrated that it is even possible to become a Democratic president without the full support of the solid South, no one is confident that that performance can be repeated.

With respect to stronger civil rights legislation, the Democrats cannot pass it alone since the Southern wing of the party cannot sup- Republican support will be required. Republic support will be required. Under those circumstances, the benefits will have to be shared with the adversary; and, indeed, the Republicans might benefit the most.

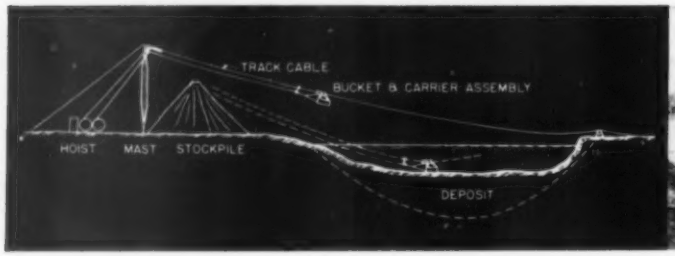
(*Continued on page 64*)

FROM PIT TO STOCKPILE...

Dig and Haul at Lowest Cost with a Sauerman Slackline



DIGS AND HAULS—New Sauerman Slackliner Bucket is especially designed for tough digging. It inhauls at high speed, dumps automatically, and returns to digging point by gravity.



STOCKPILES MATERIAL—Regardless of long hauls, the Slackline builds a large surge pile to allow charging the plant at any desired rate. Plenty of material is in ready reserve for seasonal or unexpected increases in schedule.

Operating costs as low as 8¢ per yd. for labor, power and maintenance are reported by Slackline Cableway owners when digging free-caving material at average depth and haul distances.

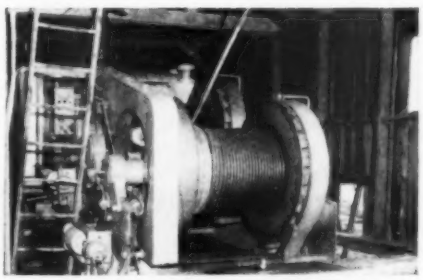
These low costs are achieved by using just one machine—the new Sauerman Slackline Cableway. Multiple equipment is not needed to supply your required tonnage. For example, on an average haul and digging depth, a single medium size machine will charge a 200 tph. plant.

The high Slackline mast permits building a large pile which can supply plant demands through a plate feeder and tunnel conveyor, front-end loader or clamshell. The new Sauerman torque converter diesel-hoist automatically matches power to load demands and is designed for continuous duty. Fluid drive cushions out shock loads to reduce fuel and maintenance costs, extend cable life.

Increasing land values and depleting resources make it necessary to get all the material out of your deposit. You can do this with a Sauerman Slackline. The machine will dig from ground level to deep under water and keep your plant running additional years at the lowest possible operating cost. Several pits are now operating Slacklines on 1000-ft. spans with average hauls of 500 to 700 ft. and from 100-ft. depths.

Write or call, giving your tonnage requirements, depth and length of deposit—if available. We will promptly supply more information on Slackline Cableways, and show you how to *save with a Sauerman.*

CONTROL IS REMOTE, EFFICIENT AND SAFE—Control station can be conveniently located at any strategic point in plant area. Operator can watch entire operation. Fatigue is minimized and personal danger eliminated.



TORQUE CONVERTER INCREASES PRODUCTION, CUTS MAINTENANCE—Now available, the new Sauerman Torque Converter Hoist automatically matches power to load, provides a smooth and steady flow of material, reduces fuel, maintenance and cable costs.

SAUERMAN BROS., INC. 634 SO. 28th AVE. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent Scrapers • Slackline and Toutline Cableways • Durolite Blocks

Labor Developments

Premium Pay for Week-end Work

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

PAYMENT of premium rates for work performed on Saturday and Sunday, or on the sixth and seventh day of the work week, has become so commonplace that the Bureau of Labor Statistics found such provisions in 90 percent of the labor agreements included in a recent study.

Almost 60 percent of the agreements provided specifically for extra pay for work on Saturdays, as such. As recently as 1952, such a provision was found in only 48 percent of the agreements studied. Most of these contract clauses contain no limitations. A fourth of them exclude from coverage employees in continuous process operations which must be manned every day, or certain occupational groups such as watchmen, guards, or engineers or maintenance men who regularly must work Saturday.

For such employees, the provisions customarily state that premium pay will be provided, not on Saturday, as such, but on the sixth day of their regular work week. Eleven percent of the clauses require that the employee must have worked a certain amount of time during the week, usually the full weekly schedule, in order to be eligible for the premium rate for Saturday work. However, generally, work time lost during the week because of excused absences or for such reasons as illness, lack of work, or holidays, would be regarded as if it were time worked for the purpose of determining whether the Saturday work is to be paid for at premium rates.

In 80 percent of the contracts the rate for Saturday work was established at time and one-half. In 10 percent, double time was provided.

A higher proportion, 75 percent of the agreements, specified premium pay for Sunday work. About one-fifth of them excluded from coverage employees in continuous process operations or those having work weeks which regularly include Sunday, who are usually covered instead by provisions for premium pay on the seventh day of their work week. Practically all of the agreements—93 percent—required premium pay for all Sunday work, irrespective of the number of weekly hours worked.

About 20 percent of the contracts provided time and one-half for Sunday premium pay, while about 75 percent provided double time.

Sixth- and Seventh-Day Premium Pay

Provisions for premium pay on the sixth and seventh day of the work week are generally designed to take care of workers regularly scheduled to work on Saturday and Sunday. They usually require that the employee must have worked all of the preceding days in the week (except for specified types of absences) to be eligible for premium rates on the sixth and seventh day.

For the sixth day, the premium rate is almost always time and one-half; for the seventh day, it is usually double time.

In recent years, however, the practice has been growing very rapidly to pay Sunday premiums (and to a lesser extent Saturday premiums) even for workers who regularly work on Sunday (or Saturday). Presumably, this is to compensate for the fact that working on Sunday (or Saturday) when most people are enjoying their week-end leisure is inconvenient.

The Labor Department study found that 14 percent of the major agreements surveyed provided for premium pay for work regularly scheduled on Sunday, and about 3 percent provided for premium pay for work regularly scheduled on Saturday. Most of these were in industries with continuous process operations or for occupations for which Saturday and Sunday were regular work days.

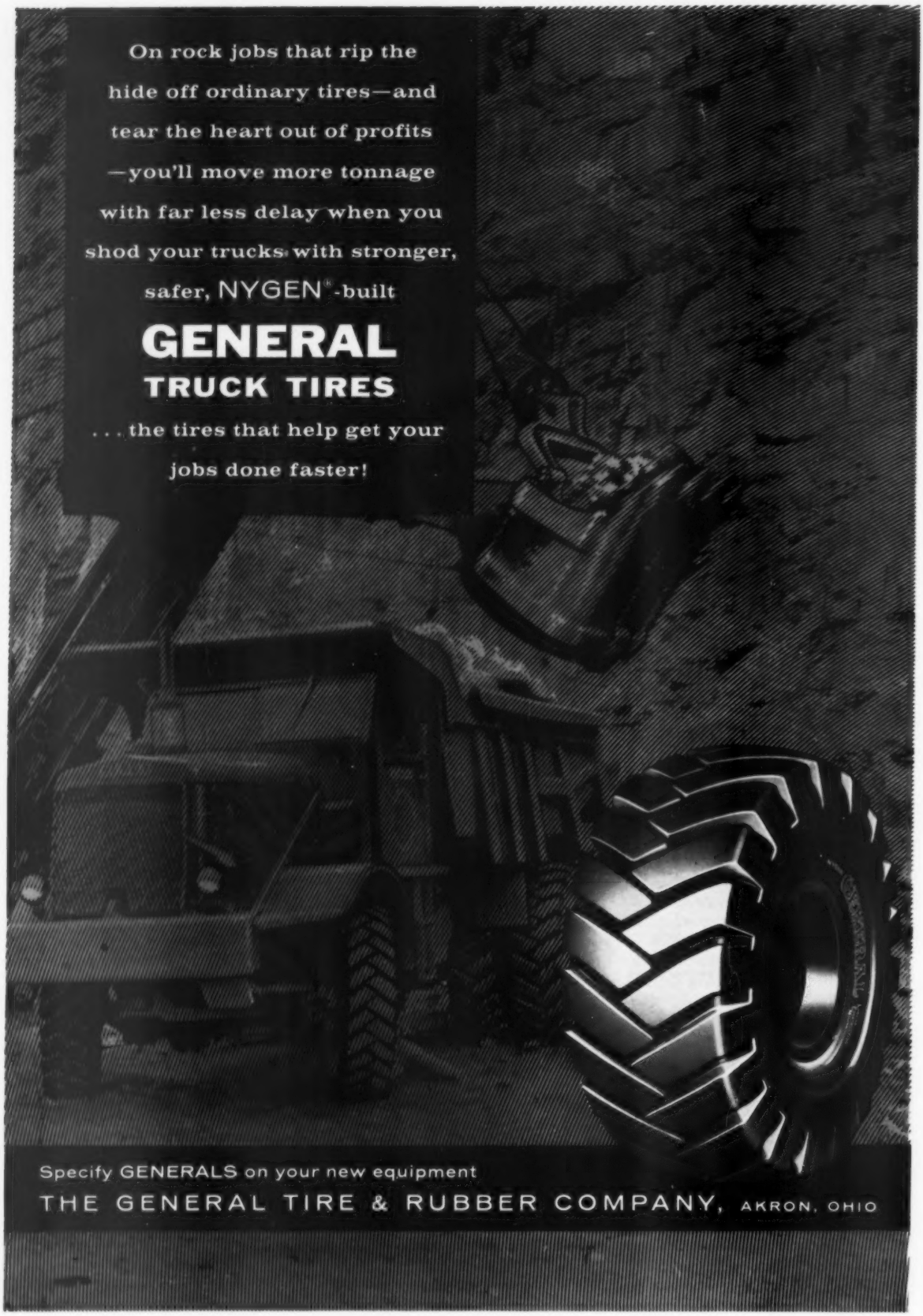
The Sunday premium rate for those who regularly work on Sunday was as follows:

1. More than one-third of those provided for time and one-half—mostly in the telephone industry.
2. Almost one-third provided for time and one-quarter—mostly in the basic steel industry.
3. A small proportion—4 percent—provided double time—mostly in the paper industry.
4. A small proportion—9 percent—provided for fixed hourly premiums ranging from 10 to 50 cents.

Finally, in the meat packing industry, the agreements provided for time and three-tenths for work done on Sunday by workers on regularly scheduled Sundays and time and three-twentieths for work done on Saturdays by workers on regularly scheduled Saturdays.

The history of premium pay for week-end work follows a pattern that has become almost a classic one. Prior to the passage of the Federal Wage and Hour Law there was very little premium pay of any kind for excessive or inconvenient hours. That law set up a standard of premium pay for excessive hours. It was purposely set high—at time and one-half—not so much to provide substantial take-home pay increases for workers but rather to place so heavy a penalty on employers that they would find it preferable to hire more employees rather than work their regular force more intensively. For the most part, this is the way it worked originally.

(Continued on page 64)


On rock jobs that rip the
hide off ordinary tires—and
tear the heart out of profits
—you'll move more tonnage
with far less delay when you
shod your trucks with stronger,
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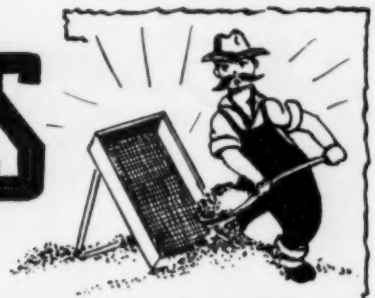
SCREENINGS



By RAY L. SMITH JR.

BRITISH scientists seem to be having a bit of trouble teaching their electric computers to do language translation. Experts recently met in London to discuss this problem and the oddities produced by the electronic brain's efforts at translation.

Somes examples of the difficulties; The phrase, "Give the imagination rein, the possibilities are endless," turned up as "let the imagination get wet, it has no tail." When the scientists fed in, "Out of sight, out of mind," it came out aptly as, "invisible idiot."

A Mere Detail

AN ITEM in the Hewitt-Robins *News of Industry* tells about a trend to supplant the old familiar black hose on service station gas pumps by hose lines of brighter hues.

Production is going forward in such colors as yellow, blue, red, white and green to match the color scheme of the various gasoline brands.

So don't be surprised if you wheel up to your favorite gasoline station some day and find that the attendent is reeling out a bright yellow or blue hose to re-fuel your car.

It seems like a fairly remote contingency, but, we're curious to know how in heck the attendent is going to cope with the cute young thing who refuses to let him gas her car because the color of the hose doesn't match her dress.

Diverse Interests

A NEWSPAPER story about the Ingred Bergman and Roberto Rossellini breakup quoted them as laying the blame on their diverse interests.

Obviously. She's interested in men. He's interested in women.

Potpourri and Succotash

The reason they sing so many of the commercials is that they sound even sillier without music.

A group of farmers were crowded around the post office window to get their mail when one of them stalked up and shouted: "Any mail for Mike Howe?"

The postal clerk, a stranger in the community, glared at him over the rims of his spectacles and shouted back: "No, not for your cow or anybody else's cow!"

A drunk fell out of a sixth-story window and landed in the street without apparent harm.

A crowd gathered around him and a cop rushed up and asked, "What happened?"

"I don't know," said the drunk, brushing himself off, "I just got here myself."

Having been married 25 years, a couple decided to celebrate their anniversary by taking a little trip. While talking over their plans one evening, the husband now and then glanced into the next room where a little old lady sat knitting. "The only thing is," he said in a whisper, "Is that for once I'd like to be by ourselves. I'd like to take this trip without your mother."

"My mother," exclaimed the wife, "I thought she was your mother."

The leading citizens of a little Ozark village had gone to considerable expense to import a town orchestra to play at their daughter's wedding. When the dancing started, the onlookers gaped at the musicians and their various instruments.

"Look at that, Zeke," cried one, pointing to the slide trombone as the musician pumped it in and out.

They watched the player for some time, fascinated. Finally Zeke leaned over to his friend. "There's a trick to it, Lem," he whispered hoarsely. "He ain't really swallerin' it."

A man who took great pride in his lawn moved into a new house where there was a heavy crop of dandelions.

After trying every known device to get rid of them. he wrote the Department of Agriculture enumerating all of the things he had tried and ending, "What should I do now?"

The reply from Washington said, "We suggest that you learn to love them."

The diapidate old car wheezed up to the toll gate.

"Seventy cents," said the attendant.

"Sold," answered the driver wearily as he walked away.

A little girl was left in sole charge of a bakery while the owner crossed the street for a package of cigarettes.

While he was gone a woman entered and seeing the little girl asked: "Aren't you tempted to eat an eclair when no one is looking?"

Little Girl: "Oh, no, that would be stealing" (perking up brightly). "I just lick 'em."

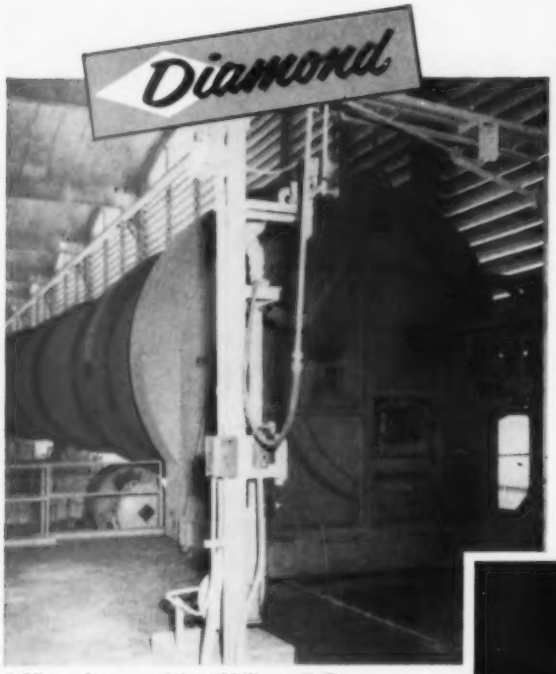
"My, what a pretty watch," said the man, admiring a small boy's new timepiece. "Does it tell you the time?"

"No, sir," replied the little fellow, "you gotta look at it."

It was late in the evening when the hostess of the party asked the local soprano to sing.

"It's too late," she protested. "I would disturb the neighbors."

"Not at all," declared the hostess. "Besides, they poisoned our dog last week."



▲ View of cement kiln. "Utiliscope" Camera may be seen at right side.

▲ Close-up of "Utiliscope" Camera watching interior of kiln. Air cooled "Utiliport" protects lens against high temperature.

▼ Control Room. Operator sees kiln interior on TV monitor.

Modern Cement Plants Produce

MORE UNIFORM CEMENT CLINKER with DIAMOND "UTILISCOPE" TELEVISION

Camera Operates Efficiently in High Temperature Area . . . Provides Economy and Better Plant Layout

Close observation of the interior of the kiln is important in production of uniform high quality cement clinker. But to station an operator at an observation port on each kiln is inefficient use of man power. Also placing the instruments and controls in that location hinders good plant layout.

This problem was solved in this plant with a "Utiliscope", Diamond heavy duty Television System. A camera was installed on each of the two kilns to "see" the interior. Monitors in the air conditioned control room enable the operator to keep close watch on the burning conditions. He can continually check on the formation of clinker. Instruments and controls are also grouped in this room, so he can make immediate corrections when they are needed.

High ambient temperature (up to 2100°F at the viewing port) was no serious problem. The Diamond air cooled "Utiliport" provides adequate protection to the camera lens. The "Utiliscope" camera, which is built for tough conditions, is air cooled in this installation.

Diamond Heavy Duty Television is built to stand severe service. High temperature, dust, dirt, vibration, etc. do not impair its dependable operation.

This is only one of many ways in which the Diamond "Utiliscope" can save money, improve operation, and help produce a better product. It has been proved in a wide variety of plants and applications.

Explore the possibilities of "Utiliscope" for *your* plant. Write us for more information.

DIAMOND POWER SPECIALTY CORP.

LANCASTER, OHIO *Diamond Specialty Limited, Windsor, Ontario*

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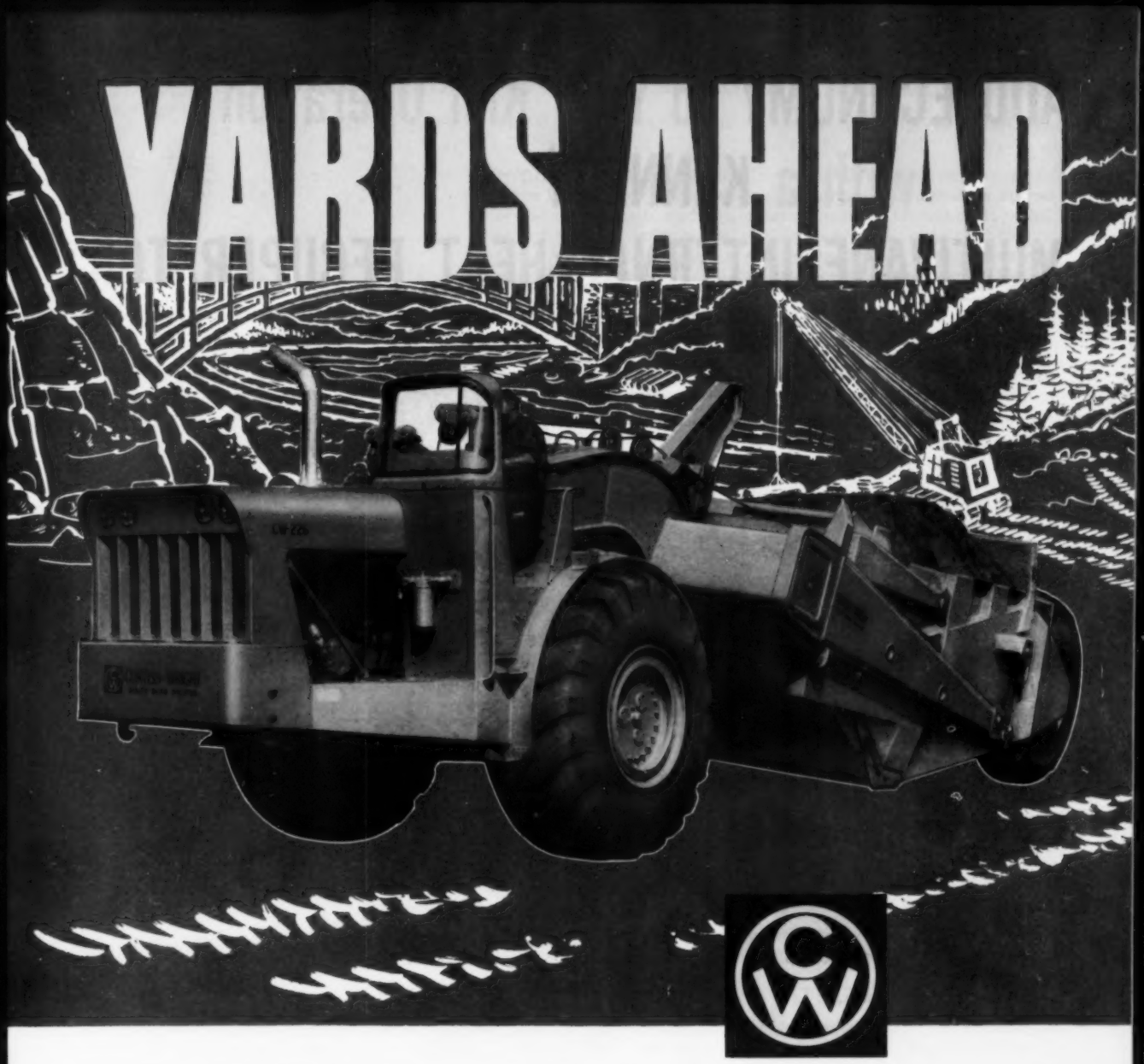


CURTISS-WRIGHT MODEL

226

CW-226 SELF-PROPELLED SCRAPER

Capacities: 26 cu. yds. struck, 36 cu. yds. heaped, 78,000 pound rated load

SALES • SERVICE • PARTS
at your
CURTISS-WRIGHT DISTRIBUTOR

Throughout the cycle — from the easy loading, through the high speed travel, to the fast dump, you're YARDS AHEAD with Curtiss-Wright scrapers. Designed and built to meet the skyrocketing production demands of today's construction industry, the CW-226 gives users a daily output unmatched by any competitive machine. See how the CW-226 can give your job a production boost — Let your C-W distributor give you complete details on the "Yards Ahead" features of the Curtiss-Wright line.

SOUTH BEND DIV. CURTISS-WRIGHT CORPORATION, SOUTH BEND, INDIANA

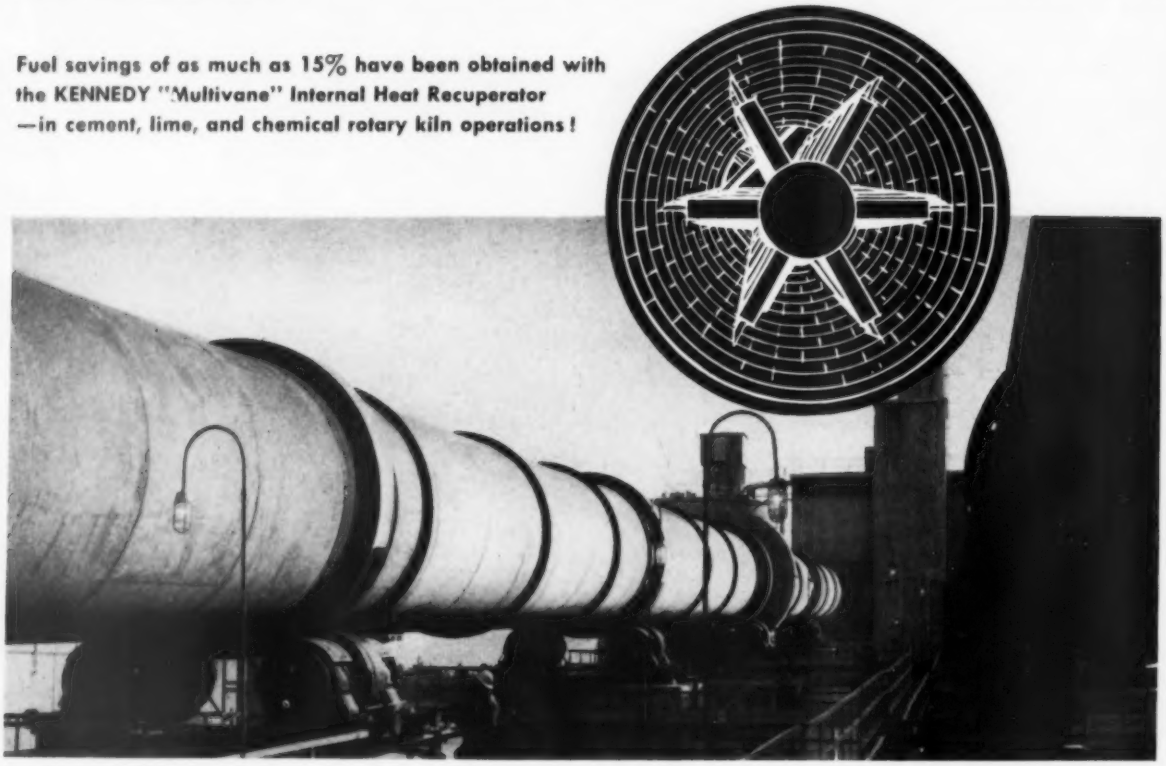
SOUTH BEND DIVISION

CURTISS-WRIGHT

CORPORATION
SOUTH BEND, INDIANA

ADD ECONOMY to Your Kiln Operation with a KENNEDY MULTIVANE INTERNAL HEAT RECUPERATOR

Fuel savings of as much as 15% have been obtained with the KENNEDY "Multivane" Internal Heat Recuperator —in cement, lime, and chemical rotary kiln operations!



ITS PRINCIPLE IS SIMPLE . . .

In ordinary rotary kiln operation, a limited percentage of the kiln charge is in direct contact with the hot refractory and with the hot gases. By installing internal, heat-resistant, cast alloy steel plates, each having six integral, diagonal vanes, both the direct heat transfer surface and the exposure of the kiln charge to the hot gases are increased by almost 200%!

ITS ADVANTAGES ARE MANY . . .

With the "Multivane" Recuperator far more heat is absorbed by the kiln charge, radiation loss is reduced and less valuable heat is lost up the stack. Gas flow is maintained at its optimum velocity and dust loss is sharply reduced.

OTHER ADVANTAGES OF THE KENNEDY "MULTIVANE" INTERNAL HEAT RECUPERATOR ARE:

- Recuperator parts are of minimum thickness, maintaining high kiln cross-sectional area;
- Alloy shoes, the exact size of refractory brick and spaced to fit the refractory courses, provide simple, yet effective, attachment to the kiln shell;
- Alloy hubs hold the recuperator in rigid alignment, but are independent of the kiln itself;
- Length and location of the recuperator in the kiln is determined by careful study and exactly fitted to the specific operation;
- KENNEDY "Multivane" Internal Heat Recuperators can be installed in existing kilns with a minimum of downtime.

ADD ECONOMY to your Kiln Operation. Investigate, with no obligation, the proven performance of the KENNEDY "Multivane" Internal Heat Recuperator.

KENNEDY VAN SAUN
MANUFACTURING & ENGINEERING CORPORATION
405 PARK AVENUE, NEW YORK 22, N. Y. • FACTORY: DANVILLE, PA.

PRIMARY & SECONDARY GYRATORY CRUSHERS • JAW CRUSHERS • ROLL CRUSHERS • IMPACT BREAKERS • HAMMER MILLS • ROD & BALL MILLS • KILNS • DRYERS • SCREENS • MECHANICAL & PNEUMATIC CONVEYORS • COMPLETE CRUSHING, LIME, CEMENT & CARBON PASTE PLANTS. KENNEDY RESEARCH & TESTING SERVICE.

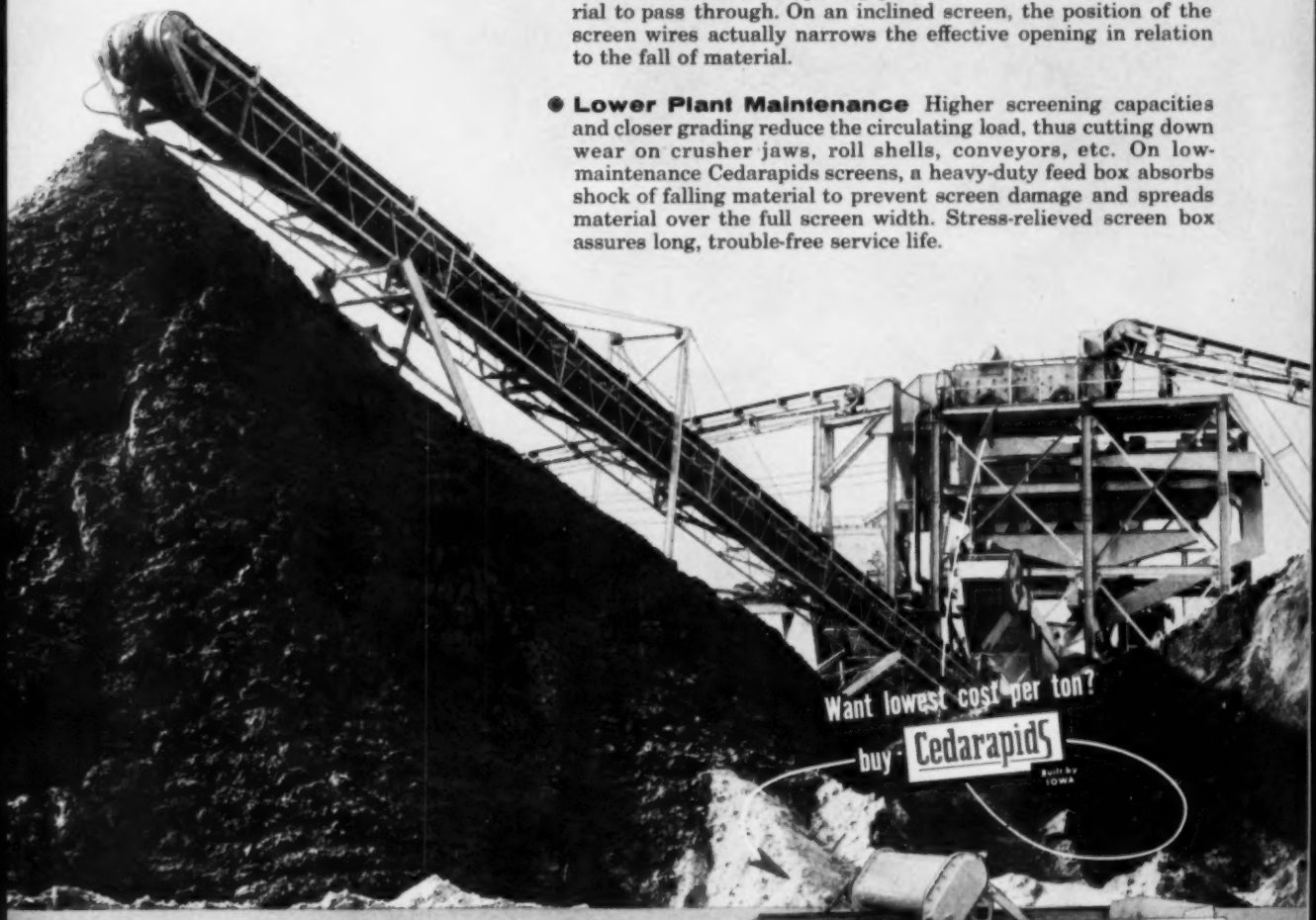
Only CEDARAPIDS HORIZONTAL VIBRATING SCREENS

can give your stationary plants these Profit-Benefits

- **Higher Plant Capacity** The *horizontal* position of the screen gives 12½% more effective screening area than inclined screens of the same length, and 30% greater capacity. Openings at right angles to the fall of material permit more material to go through the screen cloth. Crushers are not bogged down by screen carry-over. All plant components can produce more tons per hour.

- **More Accurate Gradation** The 100% effective full area of each horizontal cloth opening permits the correct size of material to pass through. On an inclined screen, the position of the screen wires actually narrows the effective opening in relation to the fall of material.

- **Lower Plant Maintenance** Higher screening capacities and closer grading reduce the circulating load, thus cutting down wear on crusher jaws, roll shells, conveyors, etc. On low-maintenance Cedarapids screens, a heavy-duty feed box absorbs shock of falling material to prevent screen damage and spreads material over the full screen width. Stress-relieved screen box assures long, trouble-free service life.



A Cedarapids Screen for Every Requirement

Sizes from 3' x 8' to 5' x 16'

Single, double or triple deck models with many different deck arrangements

Ag-lime screens with cloth openings as small as ⅛ inch

Rip rap screens

Inclined screens for jobs where low initial cost is more important than accurate gradation

Spray bar attachments

Vibrating grizzlies

IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa

Send for this Bulletin TODAY!

It describes the complete line of Cedarapids Screens and explains the many exclusive features that help you increase your plant production . . . and profits.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa
Gentlemen: Please send Bulletin CS-6

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Name_____ Title_____

Company_____

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City_____ State_____

NEW INDEPENDENT SURVEY SHOWS HOW

ANACONDA MINING MACHINE CABLE CAN SAVE YOU 75% OF THE ORIGINAL CABLE COST!

The factual report of a well-known industrial engineering firm shows that the elimination of even one cable failure per month can result in a savings of 75% of your original cable investment.

Such significant savings emphasize the importance of choosing cable of the highest quality. Don't compromise. The few cents you may seem to save initially can turn into unnecessary high costs later. Be sure—specify time-proven Anaconda Mining Machine Cable.

Copies of the report mentioned above, on a method of determining the dollar cost of cable failure, are available to qualified users on request. For your copy, or for further information on Anaconda Mining Machine Cable, see the Man from Anaconda, or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. 59214

See the Man from

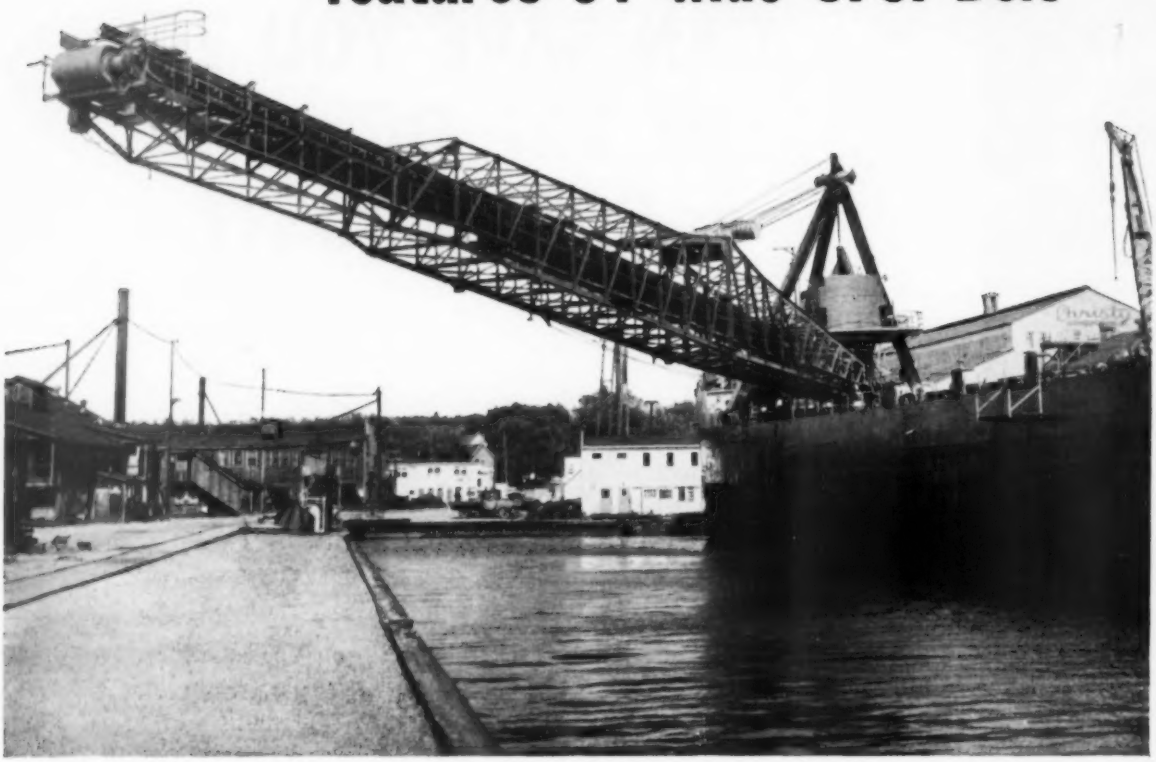
ANACONDA®

for Mining Machine Cable

Enter 20 on card, page 145

US RUBBER CONVEYOR BELTS

BIG BOOM on the Great Lakes features 54" wide U. S. Belt



To keep pace with the stepped up demand for coal and limestone, the Columbia Transportation Division of Oglebay Norton Company examined their veteran of the Great Lakes, the bulk carrier W. W. Holloway.

Could enough life be put in the old girl yet to meet the beefed-up demand? *It could.*

By converting her to a self-unloader, by installing a 245-foot conveyor boom (one of the largest on the Great Lakes) and finally, by equipping the boom with a 54" U. S. Rubber Conveyor Belt, today the 52-year-old ship is operating profitably. Each hour, 3500 tons of 90-lb. limestone are dumped onto the conveyor belt and carried ashore at a speed of 625 fpm. Because "U.S." belts are built to carry heavy loads and withstand abrasion, this U. S. Giant® is operating perfectly, helping to turn this ship from a has-been into a heroine.

For conversion, replacement, or new installations, U. S. Rubber has the right belt and the best engineering skills to do the job.

When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

News of the Industry

Material Service Merger With General Dynamics Approved by Directors

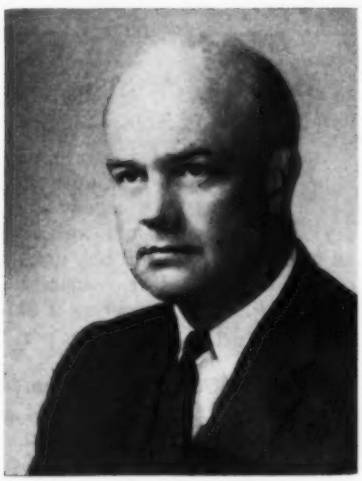
Directors of Material Service Corporation and General Dynamics Corporation have approved a merger plan whereby General Dynamics will acquire Material Service through an exchange of stock, pending final approval of shareholders.

Plans call for Material Service to operate as an autonomous division of General Dynamics, with Henry Crown continuing as chairman of the board, and no change in the Crown family's interests in the firm. Lester Crown will continue as president of subsidiary Marblehead Lime Company.

Already a diversified enterprise with 1958 sales exceeding one and one-half billion dollars, General Dynamics is engaged in a long-term program to supplement its defense business with expanding commercial businesses. Material Service had record sales of $114,395,800 in 1958.

Three Kentucky Concerns Join Vulcan Materials Co.

Bernard A. Monaghan, recently elected president of Vulcan Materials Company, announced the approval of the Vulcan's board of directors of the acquisition of the Ralph E. Mills Company, Frankfort, Ky., and Talbott Construction Corporation and Talco Constructors, Inc., Winchester, Ky. These three companies are frequent participants with other leading construction firms in joint-venture heavy construction projects in both this country and overseas.



B. A. Monaghan

The acquisition, to be effected through completion of stock transfer arrangements with Ralph E. Mills and Scott Talbott, principal owners of the companies, will enable Vulcan to service larger foreign and domestic construction projects, such as hydroelectric dams, railroad tunnels, air bases, as well as highway construction.

The Mills and Talbott companies will retain their individual identities and organizations, with Mr. Mills in charge of planning and execution of construction projects.

U. S. Bureau of Mines Plans Expanded Research On Blasting Effects

Blasting at stone quarries and other mining operations will be studied by U. S. Bureau of Mines scientists as a part of intensified research on such vibrations and their effects on buildings, dams, and similar structures. The study, partly supported by the National Crushed Stone Association, will seek basic knowledge of physical effects of blast vibrations, and evaluate present industrial seismic equipment.

Research will be directed by the Applied Physics Laboratory in the Bureau's eastern experiment station at College Park, Md. The study will include controlled blasting tests at several privately owned quarries.

Stepped-up research is expected to produce important dividends for the industries now facing expanding construction demands.

Coming Events

September 14-17, 1959—Denver. Metal-mining industrial minerals convention, American Mining Congress.

September 24-26, 1959—Bedford, Pa. Joint meeting, The Coal and Industrial Minerals Divisions, Society of Mining Engineers of A.I.M.E. Bedford Springs Hotel.

September 27-30, 1959 — Lake Placid. Semi-annual meeting, board of directors, National Sand and Gravel Association. Lake Placid Club.

October 1-3, 1959—Philadelphia. Operating meeting, National Lime Association. Sheraton Hotel.

October 11-16, 1959—San Francisco. Third Pacific Area national meeting, American Society for Testing Materials. Sheraton-Palace Hotel.

October 29-30, 1959 — Boca Raton, Fla. 42nd annual meeting, National Slag Association. Boca Raton Hotel and Club.

Growing Business Optimism Shown by May Increase In Building, Dodge Reports

Continued gains in housing, manufacturing buildings, and commercial buildings boosted construction contracts in May in the United States to $3,541,858,000, an increase of 4 percent over the same month last year, according to F. W. Dodge Corporation.

Dr. George Cline Smith, Dodge vice-president and economist, said of the latest figures, "So far in 1959, housing has been the chief source of strength in the construction picture. However, sharp gains in contracts for manufacturing and commercial buildings in the past several months reflect growing business optimism and indicate increased activity in the months ahead."

Residential building contracts in May totalled $1,677,324,000, up 25 percent over the May, 1958, level. Within this category, contracts for single family homes scored the largest increase—33 percent. The number of dwelling units represented by total residential contracts in May was 129,717, a gain of 25 percent over the same month last year.

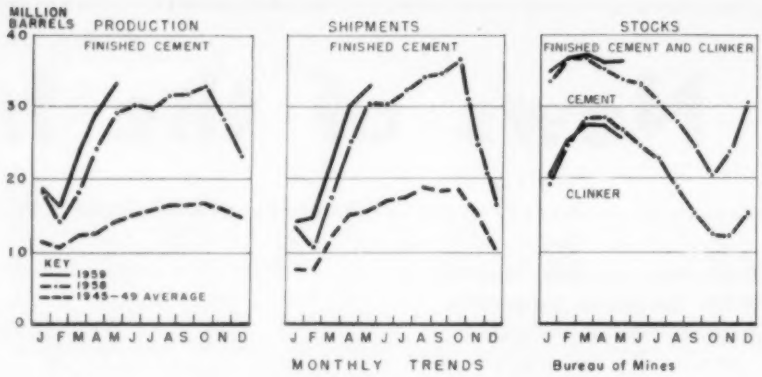
Contracts for nonresidential buildings in May were valued at $1,071,520,000, down 5 percent from a year ago. Sharp gains in contracts for commercial, manufacturing, and religious buildings were more than offset by declines in the other nonresidential building types.

May contracts for heavy engineering construction amounted to $793,014,000, down 15 percent from the like 1958 month. Within this category, both public works and utilities were down from a year ago.

Cumulative totals of contracts for the first five months of 1959, with percentage changes from the comparable 1958 period, were as follows: nonresidential building at $4,669,710,000, up 3 percent; residential building at $7,126,054,000, up 39 percent; heavy engineering at $3,434,570,000, up 4 per cent; and total construction at $15,230,334,000, up 17 percent.

Production of cement in Czechoslovakia during 1958 totalled 4,100,000 metric tons, an increase of 12 percent over 1957, according to the U. S. Bureau of Mines. The Senec cement plant near Banska Bystrica, Slovakia, which began operating during mid-1958, is expected to produce 500,000 tons of portland cement annually.

Southern Industries Incorporated has acquired a 19-acre site on the Intracoastal Waterway at Morgan City, La., for the construction of a $1,250,000 shell crushing and lime plant.



— May, 1959, Finished Portland Cement —

SUMMARY—Production of finished portland cement in May, 1959, as reported to the U.S. Bureau of Mines, totalled 33,428,000 bbl., an increase of 14 percent over May, 1958. Mill shipments in May, 1959, totalled 32,992,000 bbl., an increase of 8 percent over May, 1958. Stocks of 36,528,000 bbl. of finished portland cement on hand May 31, 1959, were 8 percent more than those on hand May 31, 1958. Clinker production during May, 1959, totalled 31,956,000 bbl., an increase of 16 percent over the May, 1958, figures.

New Mexico became a producing state in May by the addition of a new plant at Tijeras.

PRODUCTION—One hundred and seventy (170) plants in 38 states and Puerto Rico reported a production of 33,428,000 bbl. of finished portland cement during May, 1959, compared with 29,274,000 bbl. produced in May, 1958.

Production of clinker during the month of May, 1959, was 31,956,000 bbl. compared with 27,574,000 bbl. during the same month last year.

High-early-strength portland cement in May, 1959, totalled 1,364,000 bbl., an increase of 35 percent over the May, 1958, production.

Prepared masonry cement production in May, 1959, of 1,549,000 bbl. increased 5 percent over the May, 1958, production.

SHIPMENTS—Mill shipments of finished portland cement for May, 1959, totalled 32,992,000 bbl. compared to 30,525,000 bbl. in May, 1958.

In May, 1959, shipments were higher in nineteen (19) districts and lower in four (4) districts than in May, 1958. The greatest increases were in the Georgia-Florida, Virginia-South Carolina, and Ohio districts. The greatest decrease was in the Illinois district.

Mill shipments of high-early-strength portland cement totalled 1,460,000 bbl. in May, 1959, a 30 percent increase over the 1,127,000 bbl. shipped in May, 1958. Mill shipments of prepared masonry cement in May, 1959, totalled 1,616,000 bbl., an increase of 13 percent over the 1,425,000 bbl. shipped in May, 1958. Over one-half of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 36,528,000 bbl. of finished portland cement were on hand May 31, 1959, an increase of 8 percent over the 33,673,000 bbl. on hand May 31, 1958. Stocks of clinker on hand May 31, 1959, totalled 25,737,000 bbl., a decrease of 3 percent from the 26,587,000 bbl. on hand May 31, 1958.

FIRST FOUR MONTHS OF 1959—For the January-May period, 1959, the volume of production of finished cement amounted to 122,164,000 bbl., compared with 103,668,000 bbl. in the comparable period of 1958. Total shipments for the first four months of 1959 are reported at 115,339,000 bbl.; in the same period of 1958 total shipments were 97,776,000 bbl.

$6,500,000 Plant Going Up For Oklahoma Cement Company

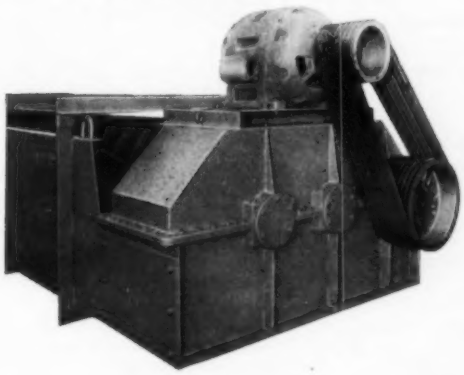
Construction has begun on a $6,500,000 plant near Pryor, Okla., for Oklahoma Cement Company. The dry process cement mill will have an estimated 1,000,000 bbl. annual output. Cloyce K. Box, manager of George Fuller Engineering Company's office in Dallas, Tex., is president of the new company.

Oklahoma Cement has purchased the assets of Ozark Portland Cement Company, and additional limestone and clay properties adjoining the original Ozark properties.

Fletcher Limestone Co., Inc., Fletcher, N. C., reports:

"Our customers are pleased with the job done by our Eagle Log Washer !"

W. N. LANCE, president of Fletcher Limestone Co., Inc., advises that their Eagle 36″ x 30′ Double Log Washer scrubs and abrades the crushed limestone delivering a clean, highly preferred product.



The corrugated paddles on the interlocking shafts not only scour the material, but convey it up the drainboard to the discharge opening, permitting the wash water to drain back. Paddle shafts are of tubular steel to prevent deflection. Paddles have replaceable 2-piece Ni-Hard chromium-nickel alloy iron shoes—top half of shoe receives brunt of wear—no need to replace entire shoe.

Totally enclosed gear drive, shown at left, runs in an oil bath—delivers steady power to the massive paddle shafts. Designed throughout for a long, economical service life—little wonder that so many sand and gravel and crushed stone producers are profiting with Eagle Log Washers. Send for the facts—Ask for Catalog 58.

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BALL BEARING TYPE MEDIUM DUTY

Designed —

to give long, trouble-free service under normal operating conditions — at distinct savings in cost.

Check these QUALITY FEATURES—

- One-piece, all-steel, welded frame with self-cleaning base; accurately and sturdily constructed.
- Balanced, tubular steel, heavy gauge rolls with heavy cast ends which keep bearings in perfect alignment.
- Precision-type ball bearings are fully enclosed, protected and permanently lubricated.
- Double bearing seals keep grease in and dirt out.
- Interchangeable roller assemblies locked in place by clips and cotters.
- Slotted locating collars are set-screwed to heavy, fixed steel shaft; prevents excessive movement of roll assembly and serves as an additional bearing seal.
- In stock—troughers and returns for belt widths from 18" to 36" inclusive.
- Idlers can also be furnished with 35 and 45 degree concentrators.

Write for literature.

WEBSTER MANUFACTURING, INC.

Dept. Q-89 Tiffin, Ohio

Offices in All Principal Cities

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$3,000,000 New Mexico Plant Planned by American Gypsum

A $3,000,000 gypsum plant will be built in the near future near Albuquerque, N. M., for American Gypsum Company, a new corporation organized by Albuquerque and out-of-state businessmen. Construction is expected to start in September, with production scheduled for late 1960.

The facilities will obtain gypsum from the White Mesa gypsum deposit, about 30 air miles northwest of Albuquerque, which has measured reserves of 98,000,000 tons. The deposits have been described as the purest of any exploited in North America.

Heavy initial output of the proposed plant includes approximately 100,000,000 sq. ft. of ¾-in. wall board, and approximately 15,000 tons of miscellaneous gypsum products per year, including rough and finish plasters and agricultural gypsum.

Our Cover Picture

● Aggregates on the move. Our cover picture this month—taken at the south plant of American Aggregates Corporation in Columbus, Ohio—is representative of thousands that could be taken throughout the country to illustrate the vigor, muscle, and sinew of our basic industries. Hour after hour, day after day, these critical materials flow from our plants—materials too often ignored in eulogies on the tremendous constructive power of our nation. Aggregates are catalysts—the basic factor in transforming the dreams and designs of the country's architects, engineers, and builders into reality. Without them, plans for ever greater construction projects are but sheets of paper.

Directors of Hawaiian Cement Corp. who attended the first board meeting are Allen L. Chickering (also a director of American Cement Corp.); Robert D. Fisher, president of the new firm (vice-president of Cyprus Mines Corp.); Charles R. Wichman, Carlsmith & Carlsmith, Honolulu attorneys; Garner A. Beckett, board chairman (also board chairman of American Cement); C. C. Cadagan, vice-president of Alexander & Baldwin, and L. H. Bingham, president of GasprO, Ltd. Director Lowell S. Dillingham was absent at the time.

$12,000,000 Plant Planned By Hawaiian Cement Corp. To Be 1,000,000-Bbl. Facility

Plans for the erection of a $12,000,000 cement plant on Oahu Island are going forward, according to an announcement released by the officers of the newly formed Hawaiian Cement Corporation.

Participating in the venture are the following Hawaiian firms—GasprO, Ltd., Alexander & Baldwin, and Hawaiian Dredging & Construction Co.—and American Cement Corporation of Los Angeles and Cyprus Mines Corporation, Los Angeles, the latter two each having about 40% interest in the new firm.

Buildings will be erected on a 30-acre site leased from the James Campbell estate, and management is negotiating for limestone deposits on Campbell property nearby. In addition, the new firm will acquire 300 acres of GasprO limestone-bearing property at Waianae. (GasprO will lease its present facilities from Hawaiian Cement and will continue the production of lime there.)

Officers who will head the industry are Garner A. Beckett, chairman of the board (also board chairman of American Cement); Robert D. Fisher, president (vice-president, Cyprus Mines Corp.); R. Starke, vice-president and technical director (also serving in these capacities with American Cement, Riverside Division); C. C. Cadagan, vice-president; and Charles R. Wichman (Carlsmith & Carlsmith).

It was indicated that the entire labor force on the new cement facility will be recruited locally. Workers on jobs requiring operating skills will be trained at American Cement's Riverside and Oro Grande plants.

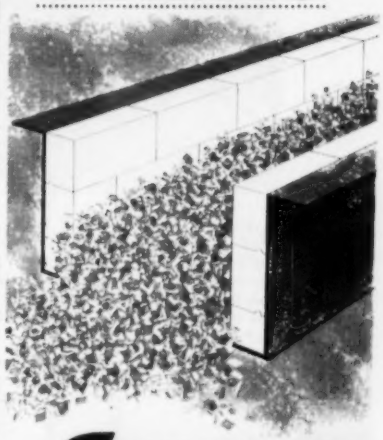
Factors contributing to the formation of the company and the plan for building the plant were the abundance of raw materials, the anticipated building boom, the development of jet air travel, and management's conviction that Hawaii needs the five standard types of high-quality cement.

To meet the expected demand for cement, Hawaiian Cement Corp. officials plan a facility which will produce more than 1,000,000 bbl. of cement annually, and provision will be made for a growing market in future years.

Utah Lime & Stone Company, a division of Flintkote Company, has been licensed to utilize the G. & W. H. Corson, Incorporated, Miracle lime process in the new $1,000,000 lime plant now under construction at Dolomite, Utah.

In Chute Linings...

OUTWEARS HARDENED STEEL 6 TIMES



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Field tests prove the amazing wear resistance of ARLCITE Blocks in chuting the most abrasive ores and materials—up to six times the useful life of hardened alloy steels!

Tough-bond high-density ARLCITE is a super-ceramic block with hardness next to diamond. The exclusive tongue and groove design insures a tightly-keyed lining, is easily laid-up in the chute and resists wear evenly due to the uniform hardness throughout the block.

Investigate the money savings ARLCITE can bring in *your* material handling. Write us!

PORCELAIN DIVISION
FERRO CORPORATION
East Liverpool, Ohio

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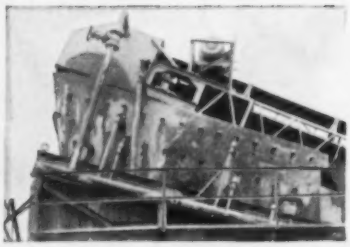
PROFIT THROUGH ...WITH SIMPLICITY

A 4' x 12' and a 4' x 10' Triple Deck Model D Gyrating Screen, set in tandem, performs a final washing and sizing operation. The washed gravel is fed to five storage bins, so that any specification can be met by blending on the conveyor belt underneath these bins.



This Simplicity 5' x 14' Two Deck Model D Gyrating Screen takes its feed from the raw material stock pile via conveyor. All decks have washing sprays. The three products produced of sand and gravel are fed by conveyors to individual stock piles.

Aggregate is carried right from the pit to this Simplicity 3' x 8' Model BG Heavy Duty Scalping Screen. Fines are screened through to the conveyor below, while oversize is scalped to crusher.

ACCURATE SIZING GYRATING SCREENS

4,500 tons of aggregate a day is classified by four Simplicity screens at Holly Sand and Gravel, near Holly, Michigan

Working two shifts of 9 hours each, the Holly Sand and Gravel Company is daily processing 4,500 tons of aggregate, and the firm's General Manager expects to exceed this total in the near future. All this material is sized on four Simplicity screens. Simplicity Model D Gyrating Screens and a Model BG Scalping Screen efficiently and accurately classify the aggregate into grades 10A, 6A, Pea Rock, Torpedo Sand, and Mason Sand. This fast and accurate sizing is typical of the performance of Simplicity Screens throughout the aggregate industry. In addition, a 3' x 6' Model C Single Deck Screen has recently been installed to produce 100% clean Pea Pebbles, by eliminating the buckshot. The Simplicity Gyrating Screen is the original type of mechanically vibrated screen using the counterbalanced eccentric shaft. The counterbalance is machined directly on the shaft, thus giving positive action with perfect smoothness.

Simplicity Gyrating Scalpers are heavy-duty machines built on the same basic principles as the Gyrating Screens, but with a grizzly deck to scalp off the oversize rock. These units are designed to withstand terrific impact. They perform two jobs at once by feeding the oversize into a crusher, and screening the fines.

Wherever you need fast, efficient scalping, screening, or feeding in your aggregate operation, Simplicity equipment can be a big help to you . . . write us today for complete information.

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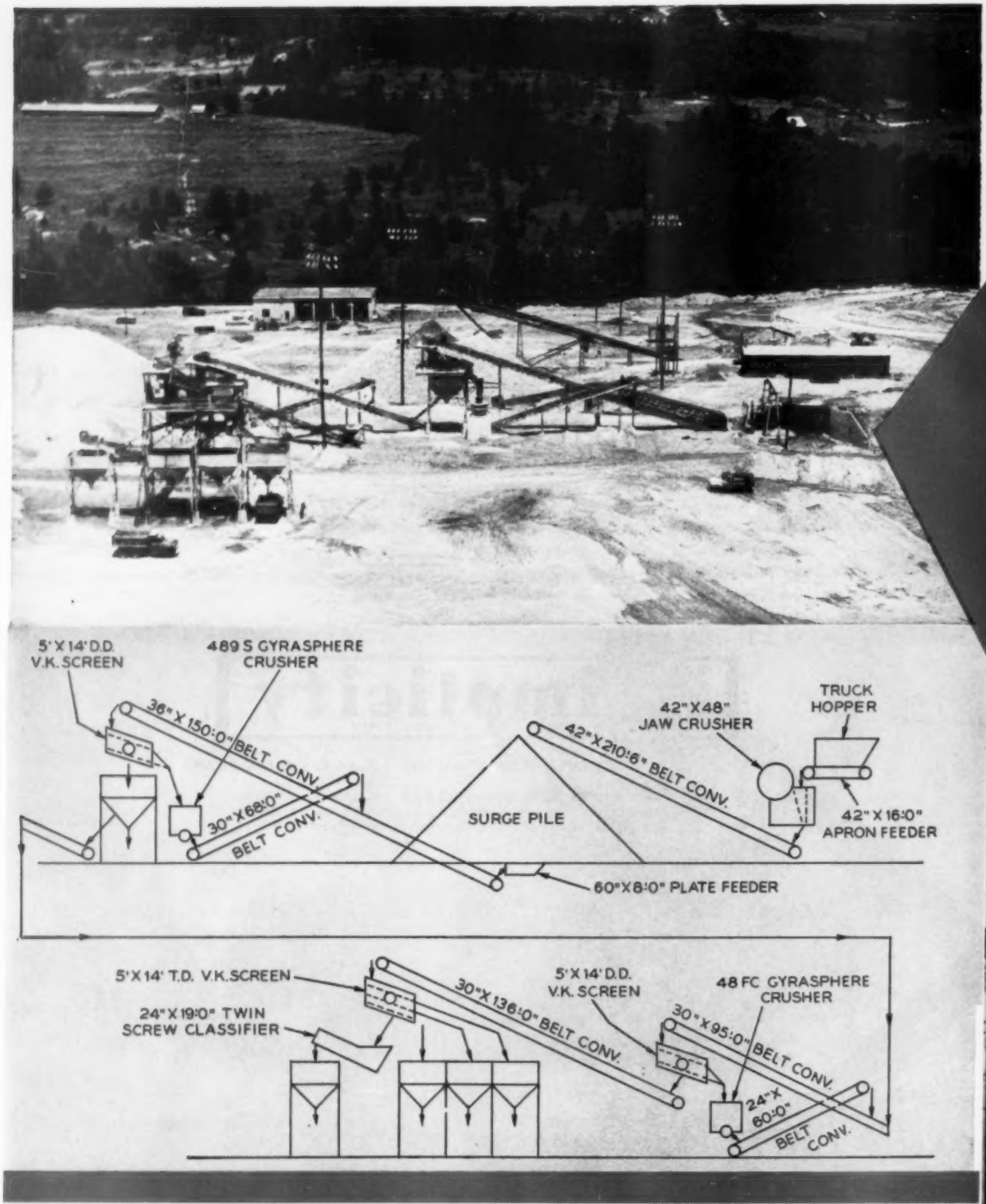

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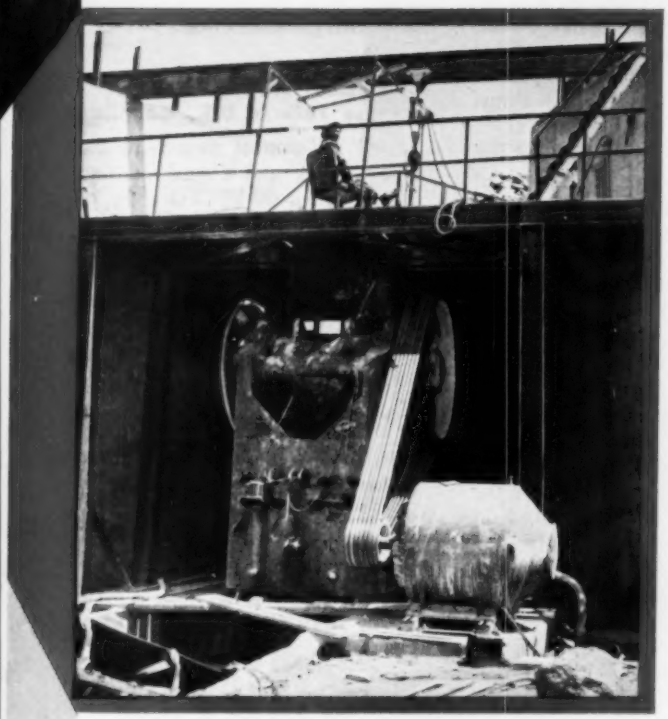


PRIMARY CRUSHING PLANT — **Telsmith 42" x 48" Roller Bearing Jaw Crusher,** with **Telsmith 42" x 16' Heavy Duty Apron Feeder,** delivers 300-400 tons hourly of minus 7" material to the surge pile. Send for Bulletin 280 describing this new, big capacity jaw crusher with welded steel frame.

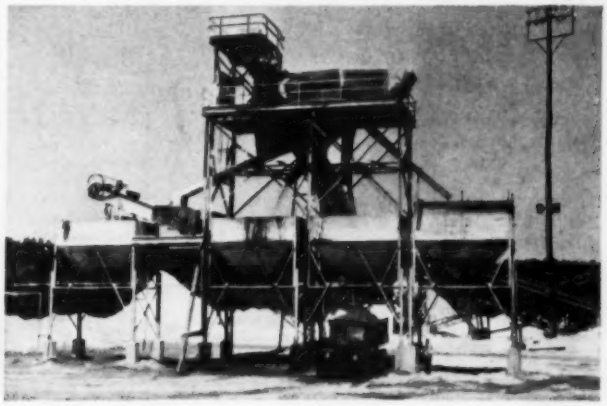
FINISHING PLANT— **All Telsmith equipped**— makes 200-225 tons hourly of minus 1¼" material. Minus 1¼" plus ¾", minus ¾" plus 4 mesh, minus 4 mesh are typical sizes Other sizes are made by changing screen cloth.

Primary Plant works 10 hours a day. The Finishing Plant works 16 hours a day, producing 3 or 4 sizes for use in batch plants and for county and state highway construction. Send for Bulletin 266 describing Telsmith Complete Plant equipment.

Telsmith 5' x 14' Double Deck Vibro-King Screen and 489-S Gyrasphere Crusher.

Telsmith 5' x 14' Triple Deck Vibro-King Screen and 24" x 19' Twin Screw Classifier.

Q-36



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1 **A "BONDED BUY"** on used Cat-built equipment is your safest buy. It's a bonded guarantee, up to $10,000 of satisfactory performance on *all* parts during the guarantee period.

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Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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BEST BUYS IN NEW AND USED EQUIPMENT

Enter 32 on card, page 145

Construction Put in Place Hits $5 Billion in June Setting Record for Month

New construction activity expanded seasonally in June and brought the total value of work put in place to new highs of $5,000,000,000 for the month, and $24,900,000,000 for the January-June period, according to preliminary estimates prepared jointly by the U. S. Departments of Labor and Commerce.

The totals for both June and the first six months were up 15 percent from a year ago. Spending for new construction thus far in 1959 was at a seasonally adjusted annual rate of $55,100,000,000, compared with actual outlays of $49,100,000,000 for the entire year 1958.

Preliminary information available through May, 1959, indicated that the overall physical volume of new construction put in place this year (expenditures adjusted for price changes) was 12 percent above the amount of work accomplished in the first 5 months of 1958.

Private outlays for new construction in the January-June, period 1959, reached a record $17,500,000,000 mainly because of the 32 percent expansion in residential building (to $10,200,000,000) over the first half of 1958. However, this year's May-to-June increase in residential construction was less than seasonal, whereas most major types of private nonresidential building (including industrial construction) expanded more than usual for the time of year.

Public construction expenditures for the first six months of 1959, at $7,400,000,000 were 14 percent above the same 1958 period, chiefly because of over-the-year increases for new work on highways, housing, and military construction.

Soil-Cement Awards in 1958 Increase 78% in U.S., Canada

Total soil-cement awards in the United States and Canada during 1958 exceeded the 1957 total by 78 percent, according to the Portland Cement Association. Contract totals rose from 27,200,000 sq. yd. in 1957 to 48,600,000 sq. yd. last year.

The major application of soil-cement has been as a base course for road and street pavements. The use of soil-cement base for roads alone has multiplied six times in the last ten years.

Open Market Lime Sales Show Increase for April

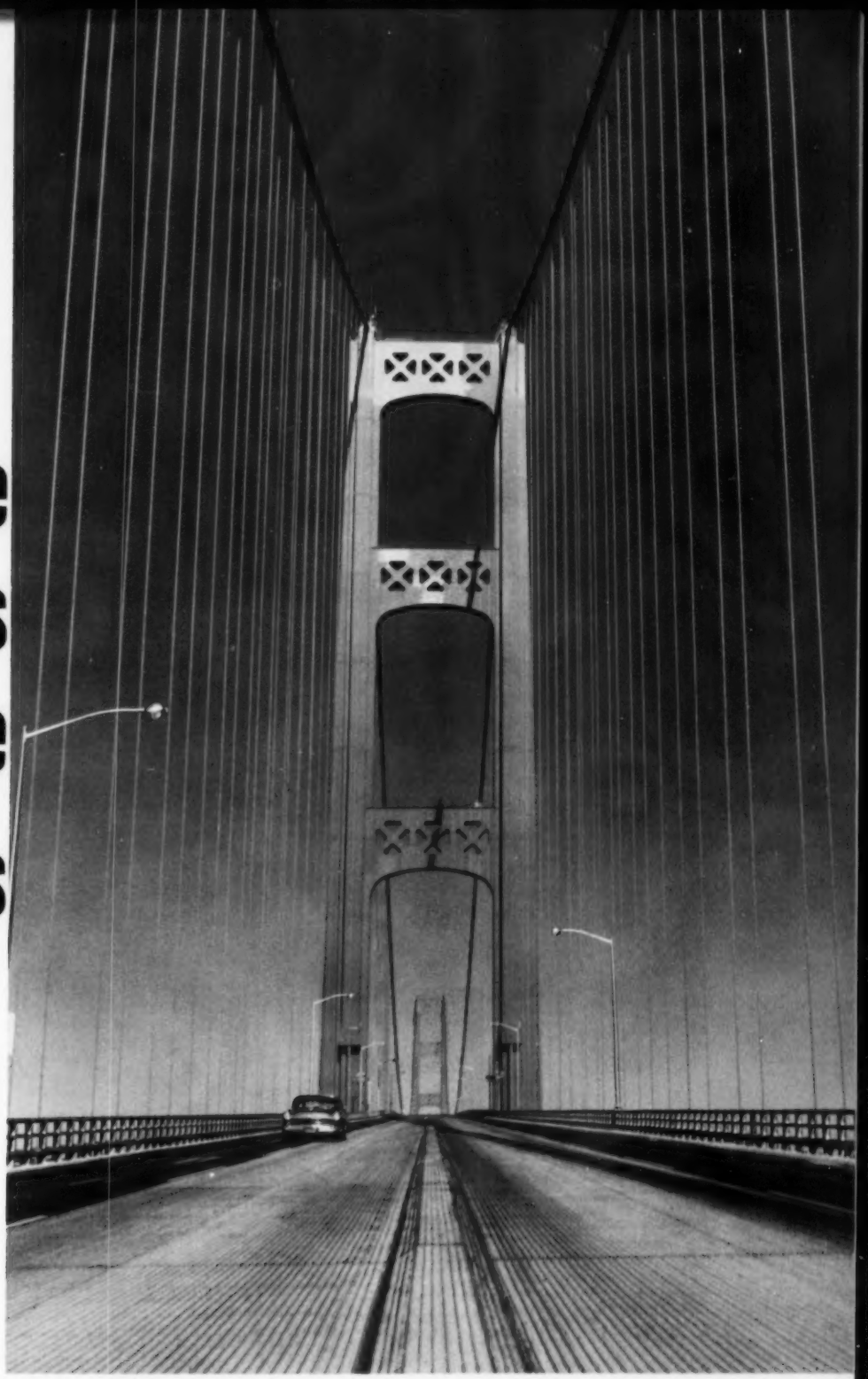
Domestic sales of open-market lime in April (848,597 short tons) increased from the previous month's output, according to reports made by producers to the U.S. Bureau of Mines. Agricultural, construction, chemical, and other industrial lime increased, whereas a slight decrease was noted in refractory lime. Note the accompanying chart.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1958-1959, by Types and Major Uses in Short Tons

	March 1959	April 1959	April 1958	January-April 1959	January-April 1958
By types:					
Quicklime	[2]674,366	661,197	418,603	[2]2,480,647	1,784,408
Hydrated lime	173,184	187,400	172,063	631,576	582,554
Total	[2]847,550	848,597	590,666	[2]3,112,223	2,366,962
By uses:					
Agricultural:					
Quicklime	[2]8,308	9,993	6,827	[2]24,405	14,304
Hydrated lime	15,579	19,737	23,463	46,889	47,537
Total	[2]23,887	29,730	30,290	[2]71,294	61,841
Construction:					
Quicklime	12,367	14,684	11,138	49,024	39,230
Hydrated lime	76,278	87,794	82,224	279,402	271,521
Total	88,645	102,478	93,362	328,426	310,751
Chemical and other industrial:					
Quicklime	[2]429,822	444,033	297,368	[2]1,603,673	1,262,196
Hydrated lime	81,327	79,869	66,376	305,285	263,496
Total	[2]511,149	523,902	363,744	[2]1,908,958	1,525,692
Refractory (dead-burned dolomite)	223,869	192,487	103,270	803,545	468,678

[1]Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.
[2]Revised figure.

five famous rope jobs



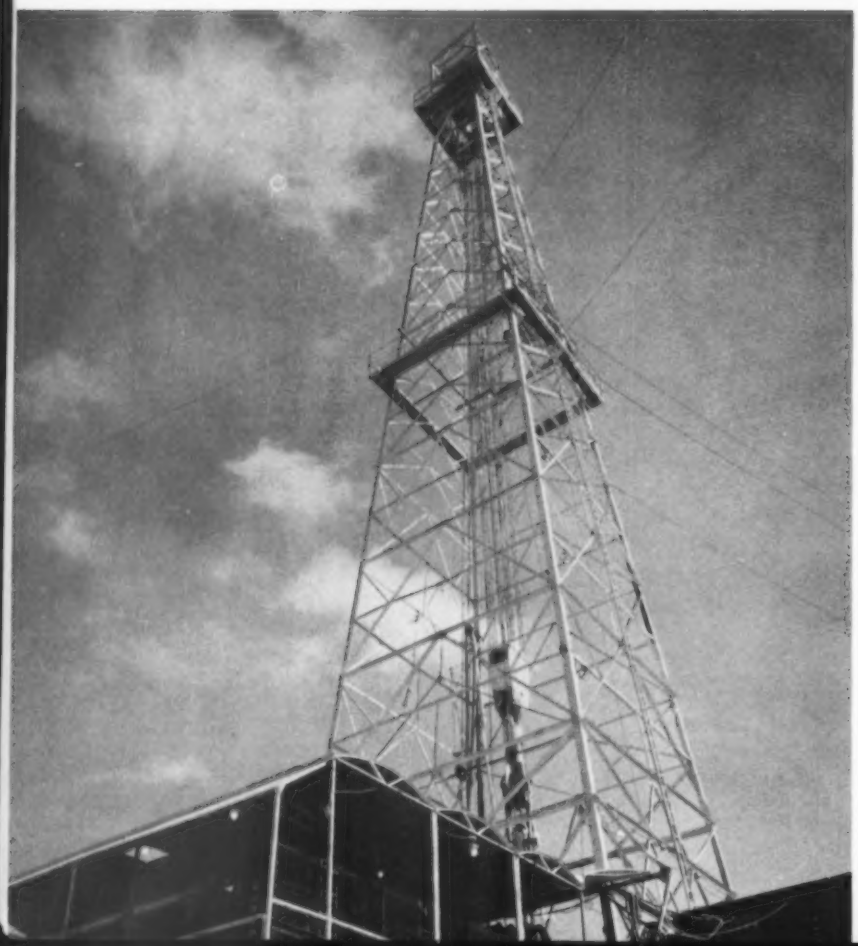
The Mighty Mackinac

World's longest suspension bridge. The main cables took 42,000 miles of wire—enough to go almost twice around the world. The roadway is supported by 125,000 feet of USS Tiger Brand Bridge Rope. Both wire and wire rope were made by American Steel & Wire.

(SEE FOLLOWING THREE PAGES)

Building Glen Canyon Dam

4-inch-diameter Tiger Brand Track Cables, the largest ever made in this country, span the Colorado River for these cableways. Carrying 12-cubic-yard buckets of concrete or loads up to 50 tons on each trip, they are helping to efficiently build the nation's second tallest dam, requiring 5 million cubic yards of concrete and thousands of tons of steel.



Drilling for oil 24,004 feet down

The search for oil goes deeper every day and stronger, tougher Tiger Brand Wire Rope is lifting the tremendous weight of drill pipe and casing necessary to drill the well. This is one of the world's deepest.

Harnessing Niagara's Power

The new power plant at Niagara Falls will generate 2,190,000 kilowatts of electricity, and will be the Free World's No. 1 producer of hydroelectric power. Huge shovels, rigged with Tiger Brand Wire Rope, are tearing away the rocks to make room for the power plant.

Digging 100 tons a minute

The world's largest strip mining shovels, that scoop 70 cubic yards at a bite, are rigged with Tiger Brand Wire Rope and Boom Supports. The same high-quality engineering goes into all types of Tiger Brand Wire Rope.

Why USS Tiger Brand is America's No. 1 Wire Rope

The pictures show only five of the famous projects where Tiger Brand Wire Rope is performing its job quietly and safely. You will see it helping to build our new highway system, mining coal, drilling for oil or hauling shrimp from the ocean bottom.

Wire rope provides the steel muscles that do the world's work. It lifts the ladles of molten steel . . . dredges the rivers . . . snakes logs through the forest. There is no important industry that does not depend in some way on the strength and quality of Tiger Brand Wire Rope.

On the last page of this advertisement you will see some of the research, engineering and manufacturing facilities that are necessary to produce this top-quality wire rope. To get the complete story, write for our descriptive book. American Steel & Wire, Room 842, 614 Superior Ave., N.W., Cleveland 13, Ohio.

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USS

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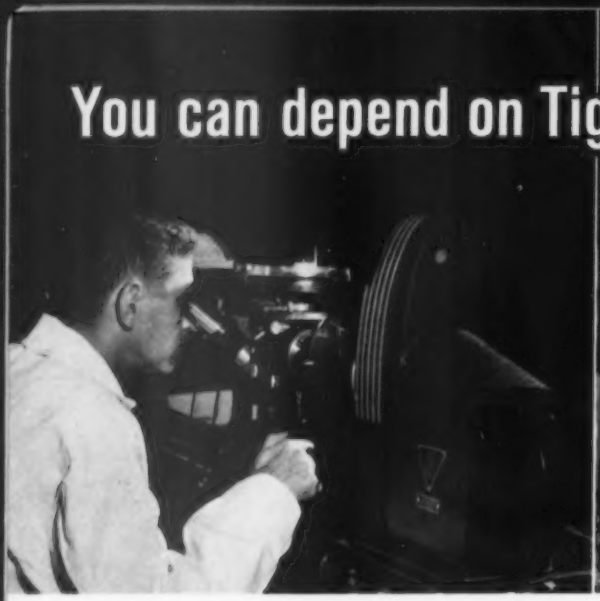
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

(TURN TO NEXT PAGE)

You can depend on Tiger Brand



Quality Control
Grain structure is examined at high magnification by means of this equipment. This is one step in AS&W's quality control program, which extends from raw material through finished product.

How many bends make a break?
Our engineers use this fatigue test to find out how long a rope can stand up under constant bending and heavy loads. Tiger Brand Wire Rope has been constantly improved because of such tests.

Testing to destruction
This Tiger Brand Galvanized Bridge Suspender Rope had to meet a specified strength of 730 tons. It was pulled until it snapped—far exceeding the specified strength requirements. Another test to assure Tiger Brand's top performance and long service.

Why Tiger Brand is your best buy

1. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry.
2. It is designed by one of the country's most capable staffs of wire rope engineers. It is serviced by thoroughly experienced field representatives always ready with their assistance.
3. Every type of Tiger Brand Wire Rope is designed for specific applications. You get the *right* rope for the job.
4. It is made by one company, U. S. Steel, and every step of production, from ore to finished product, is carefully controlled and supervised to guarantee one high standard of quality.
5. Tiger Brand Wire Rope is manufactured by the foremost single producer in the country.

USS

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

National Limestone Institute, Inc. Formed by N.A.L.I.-N.C.L.I. Merger

In a referendum by mail ballot conducted during June, members of the National Agricultural Limestone Institute and the National Crushed Limestone Institute voted to consolidate the separate corporations. November 1 will be the effective date on which the joint groups will become the National Limestone Institute, Inc.

Factors affecting and resulting from a possible merger have actually been under study for about a year by special committees representing the separate associations. The recommendation of the committees for merger was voted upon and accepted by the board of each organization at their respective mid-year board sessions held June 8-9 in Chicago (See PIT AND QUARRY, July, 1959, pp. 46 and 78.). The boards at that time authorized a mail ballot of the general membership.

R. M. Koch

W. L. Bryan

The new corporation will have an Agricultural Limestone Division and a Crushed Limestone Division. Each division is to have a separate board and a separate budget, but there will be one group of executive officers and one executive committee. The prestige of the new N.L.I. is to back the policies or proposals of both divisions. The twin goals of increased operating efficiency and greater service to members are expected to be reached under the new corporation.

T. E. Lalley

The present officers will direct the activities until next January, when officers of the new association will be elected at the annual convention. W. L. Bryan (Bryan Rock Products, Inc.), Shakopee, Minn., is chairman of the board of N.A.L.I. Thomas E. Lalley (Bradford Hills Quarry Inc.), East Petersburg, Pa., is president of N.C.L.I. Robert M. Koch is president of the former group, and executive vice-president of the latter.

2nd Preheater Scheduled In $1,000,000 Modernization At Alpha's Cement Plant

Preparations are under way for the installation of a new preheater on the No. 2 Kiln at the Cementon, N. Y., plant of the Alpha Portland Cement Company. The preheater is part of a $1,000,000 modernization program, and is expected to be in operation within six months.

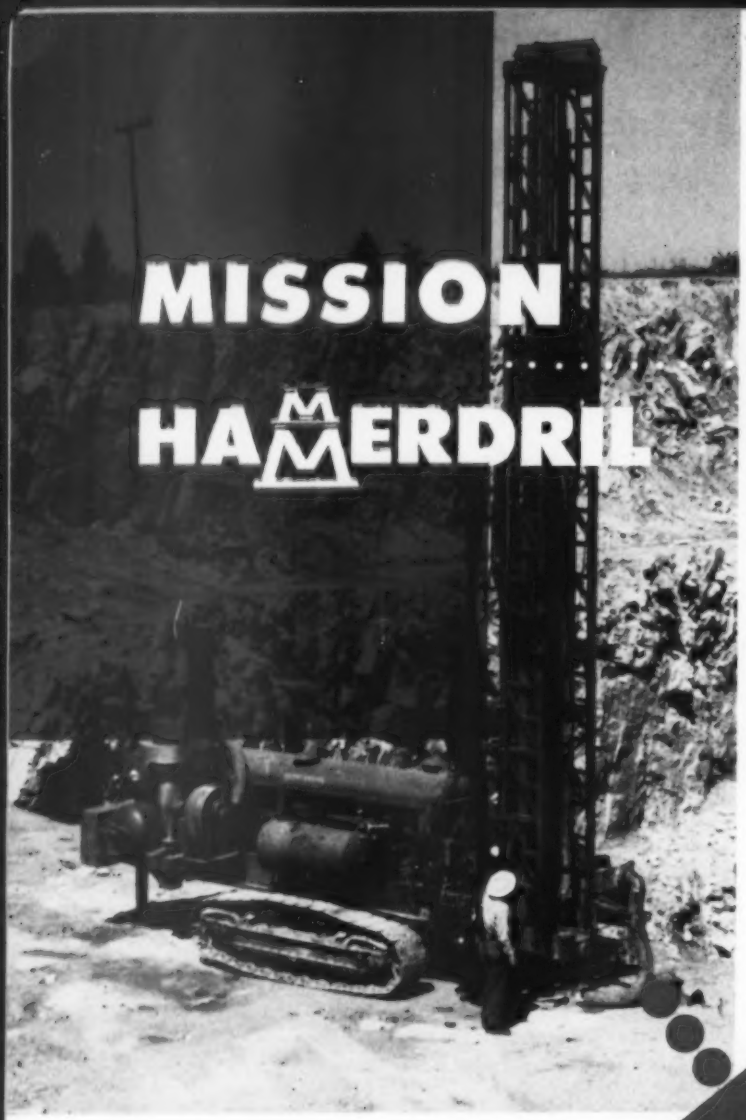
A similar preheater installed on the No. 3 Kiln during the $5,000,000 expansion and modernization of the plant in 1953-1956 uses 30 percent less fuel than the No. 1 and 2 kilns, not so equipped. Use of the preheater has also enabled a 600-bbl. per day increase in clinker production.

Lee Lime Adds Kiln, Forms Pozament Corp. With McNeil Brothers

Plans for expansion of the Lee lime plant at Lee, Mass., plus the formation of a new corporation which will produce a lime-fly ash pozzolanic cement especially designed for the concrete block manufacturing field, were recently announced by John M. Deely, president of Lee Lime Corporation.

A new rotary lime kiln will be installed at the Lee plant, an expansion that will more than double present capacity. Installation is expected to be underway before August 1.

Pozament Corporation, formed by Lee Lime and McNeil Brothers of Bridgeport, Conn., will manufacture the new product, called Pozament, in a plant at Bridgeport. Field tests of more than 300 different mixes in several concrete block plants reportedly proved uniformly successful. Expected lime requirements following the introduction of the new product will be met by the new kiln at the Lee plant. Fly ash will be supplied by the Connecticut Light and Power Company.



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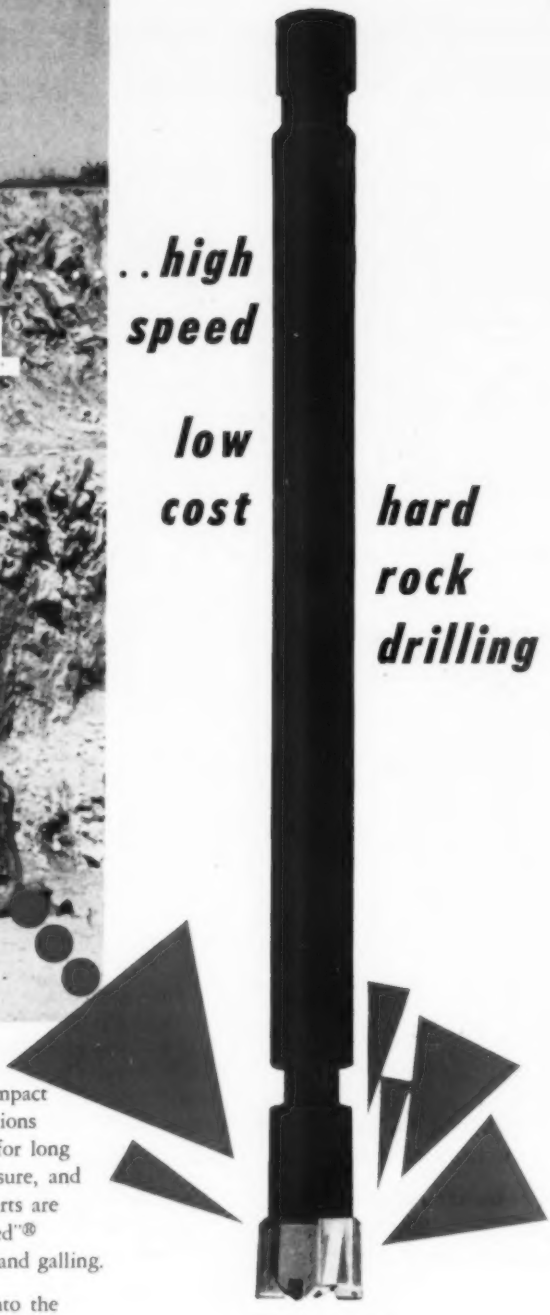
hard rock drilling



Patents Issued And Pending

The Mission HAMMERDRIL® is a "bottom hole," pneumatic impact tool, rugged enough to drill through the hardest of rock formations *day in and day out*. The HAMMERDRIL is designed and built for long life, low upkeep. There are two moving parts in the high pressure, and only three moving parts in the low pressure tool. All impact parts are of heat treated high alloy steel. All moving parts are "Missionized"® —a special surface treatment—to reduce corrosion, friction, wear, and galling.

Eight years of development and testing by Mission have gone into the HAMMERDRIL, to make it reliable and economical in use. In addition, the HAMMERDRIL can be used on your present standard rotary rig with suitable air compressor capacity.

The Mission HAMMERDRIL is sold and serviced throughout the United States. Write to Mission for more information and for what HAMMERDRIL can do for you—faster drilling, lower cost per foot.

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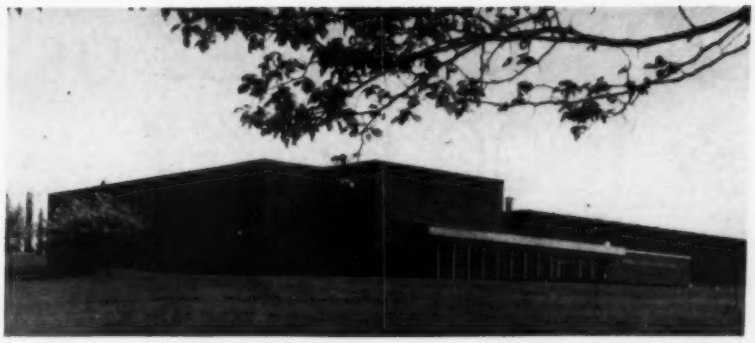


Harbison-Walker Refractories Company's Garber Research Center at Pittsburgh, Pa. At the left is the fine instruments unit, and at the right, the pilot plant. An office area connects the two units.

Garber Research Center Built For Complex Refractory Studies

On June 4, 5, and 6, the Harbison Walker Refractories Company, Pittsburgh, Pa., held open house in its new Garber Research Center. Named after Earl A. Garber, president and general manager of the company since 1948, the center was built to permit constant research toward improving established refractories and special refractories, and toward the development of new refractory materials to meet industry's demands for materials to contain its high temperature processes.

The laboratories are functionally divided into two main buildings which provide 45,000 sq. ft. of working area. Offices, the library, and conference areas are on the first floor of one building, and the second floor of that building is devoted to instrumental research. The laboratory for minerals study is an important feature because an understanding of the changes which take place in refractories during use is gained primarily through the study of the altered and new materials of which they are composed.

The penetration of a refractory by slag or even by furnace fumes may result in many mineralogical changes. The minerals identification laboratories section contains petrographic equipment for studies with transmitted and reflected light, emission and X-ray spectrographs for semi-quantitative analyses, and an X-ray diffractometer for crystal or mineral identification. This section is further complemented by a well equipped analytical chemistry laboratory and photographic facilities.

The fine instruments section also contains equipment to measure the particle size of clay-like and other fine materials, and specialized units for measuring such physical properties as thermal expansion and thermal conductivity of refractories.

The second main building, housing a pilot plant, contains all equipment associated with the manufacturing of refractories. A complete line of crushing, grinding, screening, and mixing equipment supports the various forming techniques of pressing, extruding, ramming, gunning, and casting. Pressing techniques involve a 300-ton hydraulic press, and a pneumatic impact press, the latter developed by Harbison-Walker. This area contains normal drying equipment supplemented by a completely instrumented humidity chamber.

A kiln area for heating and testing refractories is divided into an electric furnace room and a gas-fired furnace area. The former features such specialized equipment as a furnace specially designed for investigating effect on molten aluminum on refractories, and for measuring the high-temperature strength of refractories.

The gas-fired kiln area contains many reheat or test kilns. Adjoining the pilot plant area are sections devoted to making many of the more routine physical tests on refractories, such as transverse strength, compression, abrasion resistance, and permeability. Other such test facilities available are those for density, apparent porosity, and bulk specific gravity.

The management group at the research center is headed by Donald F. Stock, laboratory manager, and Dr. Edwin Ruh, assistant director of research; Donald F. King is assistant laboratory manager.

Argentine Cement Concern Begins $3,600,000 Expansion

A $3,600,000-plus expansion and modernization program will begin soon at the quarry, cement plants, and powerhouse facilities at three plants owned by Juan Minetti e Hijos of Cordoba, Argentina. Facilities are located in Salta, Cordoba, and Mendoza provinces. All equipment will be supplied by Allis-Chalmers International.

The program includes the installation of two A-C diesel engines direct-connected to 400-kw., 50-cycle, 2400-volt generators, complete accessories and switchboard panel. Ten model TR260 rear-dump rock wagons for quarry use, two 636 Hydrocone crushers, a 48- by 42-in. A-1 jaw crusher, a 5- by 14-ft. extra-heavy-duty double-deck Ripl-Flo screen, and a 10½- by 17-ft. dry-grinding ball mill with a 1,000-hp. synchronous motor are included in the scheduled list of additions.

Also included will be a 10- by 375-ft. dry processing five-support rotary kiln and auxiliaries; a 75/100-hp. drive, control, starter, and control panel; a 4½- by 70-ft. air quenching clinker cooler; and pumps, motors, drives, controls, conveyors, elevators, etc.

Increased cement capacity resulting from the Minetti projects is expected to help alleviate the severe cement shortage problem facing the expanding Argentine construction industry.

← Enter 38 on card, page 145

"WONDERWALL™ saves us $7.80 per 1000 bags"

Robert C. Hector, President of Hector Supply Co., holds a cost-saving Wonderwall.

Hector Supply Company of Miami, Fla., operating four plants, produces and distributes fertilizers, feeds, insecticides and plant foods.

President Robert C. Hector found that West Virginia's WONDERWALL measurably reduced his company's bag costs, yet gives better service.

"We were packing 100 pounds of fertilizer in a sewn open-mouth multiwall of natural kraft. This was constructed of 1/90 AL, 2/40, and 1/50 for a total basis weight of 220#," Mr. Hector said.

"When we switched to a WONDERWALL of 1/110 AL and 1/70 construction, we saved 40 pounds in paper basis weight, and that figures out to $7.80 per thousand bags. Equally important, our bag breakage now is negligible".

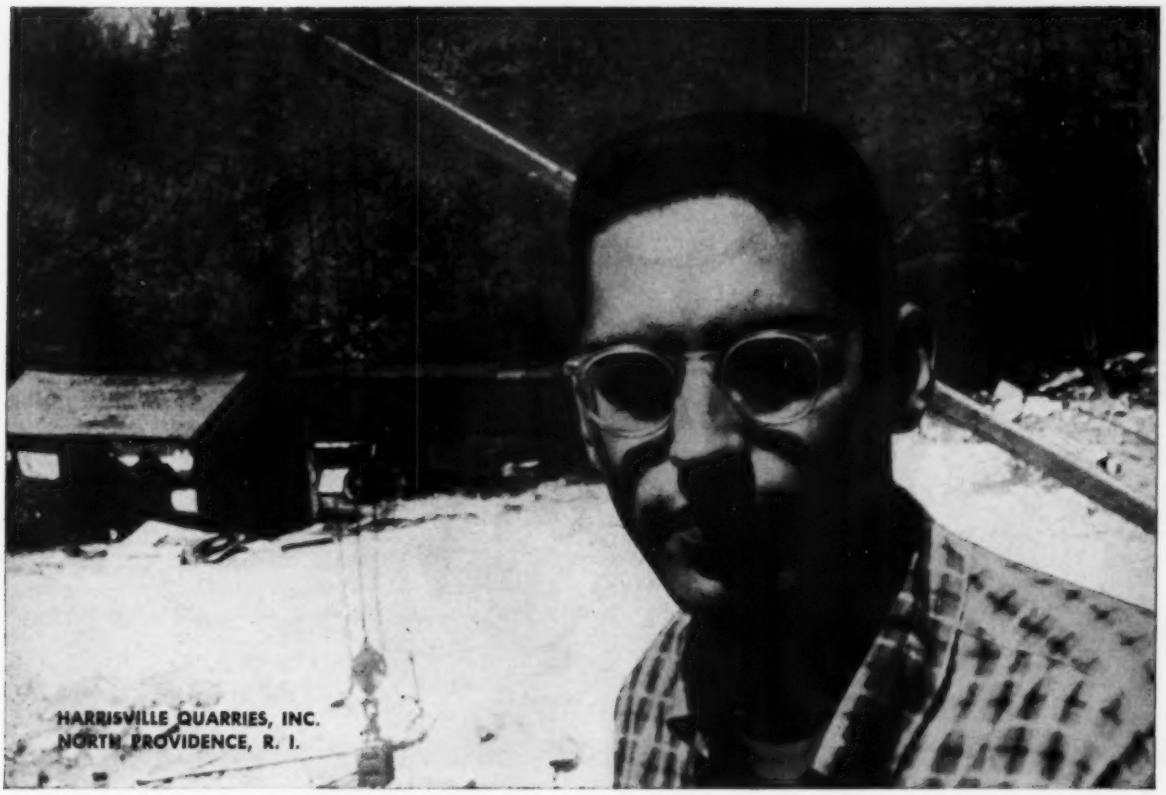
WONDERWALL bags are better because they're made with Kraftsman Clupak* paper, the tough, impact-resisting kraft with the built-in stretch—pioneered by West Virginia.

Packers of cement, feed, fertilizers, sugar, flour, and many other products are reducing bag costs substantially with WONDERWALL.

See how you can save money; we'll be glad to show you. Just write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

**Clupak, Inc.'s trademark for extensible paper, manufactured under its authority.*

West Virginia Pulp and Paper



Keep your eye on 25-year-old Anthony Donatelli

...Cities Service customer on the move

One year ago, Anthony Donatelli, Jr. took over a small quarry. It wasn't much of a quarry then. Old hands didn't think much of its chances.

But today, with the barest minimum of equipment, it is producing over 900 tons of granite per month, under young Donatelli's management.

A recent veteran of the army, Donatelli has also displayed veteran judgment as a quarry operator during this first year of operation . . . judgment that is clear in his carefully drawn plans for expansion . . . judgment that shows in his selection of Cities Service Lubricants and reliance upon his Cities Service Lubrication Engineer.

It is too early to report any maintenance records yet, but it's not too early to predict success for Anthony Donatelli. For by his reliance upon the Cities Service Lubrication Engineer he has demonstrated an all-important management talent: recognition of the usefulness of experts in the various phases that comprise any business.

Why not put your lubrication problems in the hands of an expert, too. Get the benefit of the special knowledge and economies a Cities Service Lubrication Engineer can contribute to your quarry. Call the nearest office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

900 Tons of Rhode Island Pink granite are now produced each month by Harrisville Quarries, Inc., Donatelli's firm. The granite is used for monuments, veneer, and general stone work.

Trucks and All Engines are lubricated by Cities Service C-300 Motor Oil. Probably the most versatile lubricant made, C-300 has chalked up an astounding series of performance records with quarry and construction equipment.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

"When crushers have to chew granite 8 hours a day..."

IT PAYS TO HARDFACE THEIR JAWS WITH **R-MANG**®"

AIRCO R-MANG HARDFACING WILL GIVE LONG LIFE AND HIGH IMPACT RESISTANCE TO ALL MANGANESE STEEL CASTINGS

You can add to the useful life of every manganese steel casting subjected to severe impact. Hardface with Airco R-Mang and you armor such hard biting parts as crusher jaws, dipper teeth and bucket lips with the toughest steel known. Great for repairs, too, when wear has been caused by abrasive impact. Operators find R-Mang an easy handling electrode, in either coated or bare form.

TO IMPROVE ALL YOUR HARDFACING WORK—AND ALL YOUR WELDING—CALL IN YOUR AIRCO MAN

Airco experience in hardfacing and welding includes the making of hundreds of electrodes of all classes and types, and the production of all industrial gases, equipment and supplies used in hardfacing and welding. We'd like to put this experience to work for you. Just call your nearby Airco office or Authorized Airco Dealer. You'll find him listed in the "Yellow Pages" under "Welding Equipment and Supplies."

AIRCO R-MANG molybdenum manganese electrodes are made from cold drawn heat treated core wire, and are supplied either bare or coated. Hardness of deposit will be in the range of 13-17 Rockwell C in as-welded condition. After work-hardening the deposits will show an increase in hardness to 50-54 Rockwell C. Diameters: 5/32", 3/16", 1/4" and 5/16".

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Enter 42 on card, page 145

5-Year, $125,000,000 Plan Of Expansion, Acquisitions Launched by Natl. Gypsum

National Gypsum Company recently embarked upon the most ambitious expansion program in the firm's history—a five-year, $125,000,000 plan for new plants, acquisitions, and increased production at existing facilities. The primary objectives of the 1960-1965 expansion program are to expand the firm's markets to include the entire North American continent, and to increase sales volume and income substantially.

Three new gypsum plants will be built, one in California, opening the West Coast to National Gypsum's products, and two in Canada to serve principal markets there. Coverage of the Great Lakes market will be completed when the plant at Lorain, Ohio, begins production early in 1960.

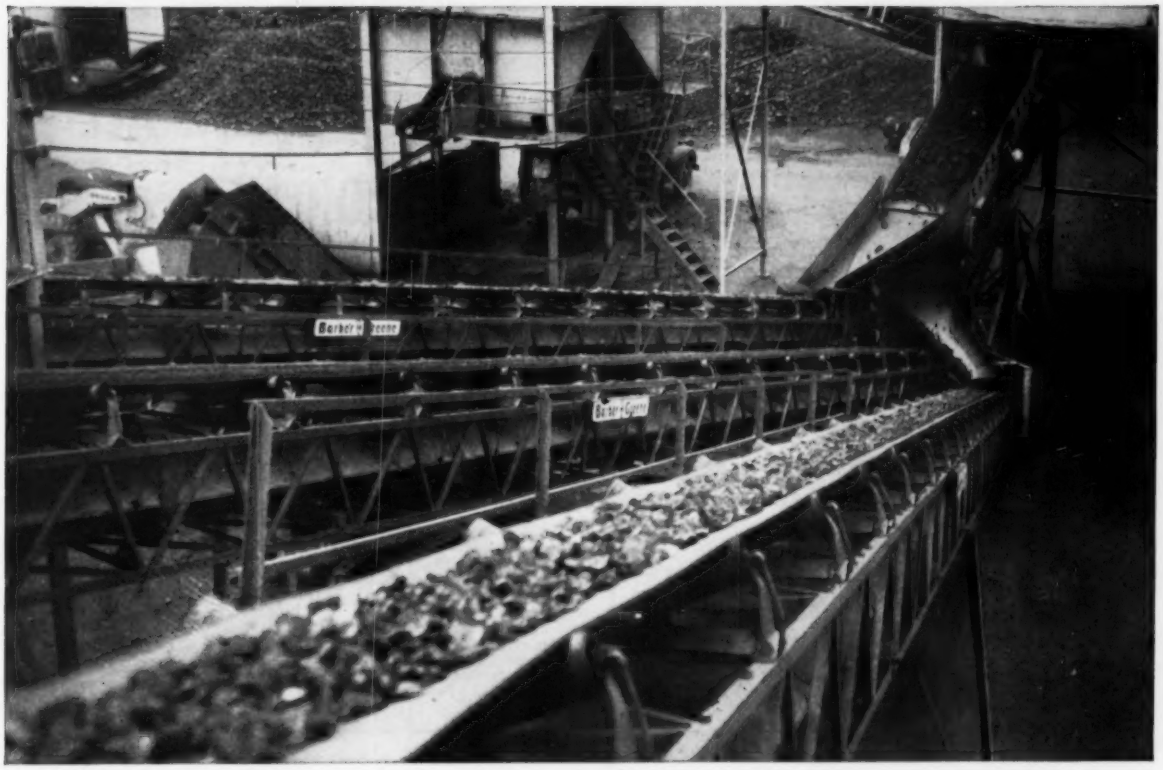
The broad program of expansion for existing production facilities includes the firm's present gypsum, lime, ceramic tile, and asbestos plants.

National's policy makers believe that entering the national market necessitates expansion of cement operations through the acquisition of several other cement mills. The firm recently entered the cement business by acquiring the Huron Portland Cement Company of Detroit through a $67,000,000 stock transaction.

The program is expected to jump sales volume from this year's estimated $215,000,000 to $365,000,000 by 1965. In 1958 the firm had earnings of $15,614,713 on sales of $163,164,450.

• Correction

On page 93 of the June issue of PIT AND QUARRY a statement concerning concrete aggregates in an article on pozzolans by Wolf G. Bauer was set in error. In point (4) of the considerations presented at the top of the third column, the word "never" was omitted. The statement should have read: "(4) aggregates are never made up of particles which can become standard in physical, or mineralogical makeup. . . "



LONG HAUL—Even the longest Barber-Greene Conveyors are built of standardized components . . . produced on a precision, quantity production basis. They can be assembled in almost limitless combinations to cut the time and cost of any material handling job.

Long or short haul—it costs less to move materials with belt conveyors

Thousands of installations—ranging from a few feet to thousands of feet—prove that belt conveyors move bulk material at lowest cost.

No other machine is so simple in construction or requires so little maintenance. No other machine can deliver such high hourly capacities with so little power or attention.

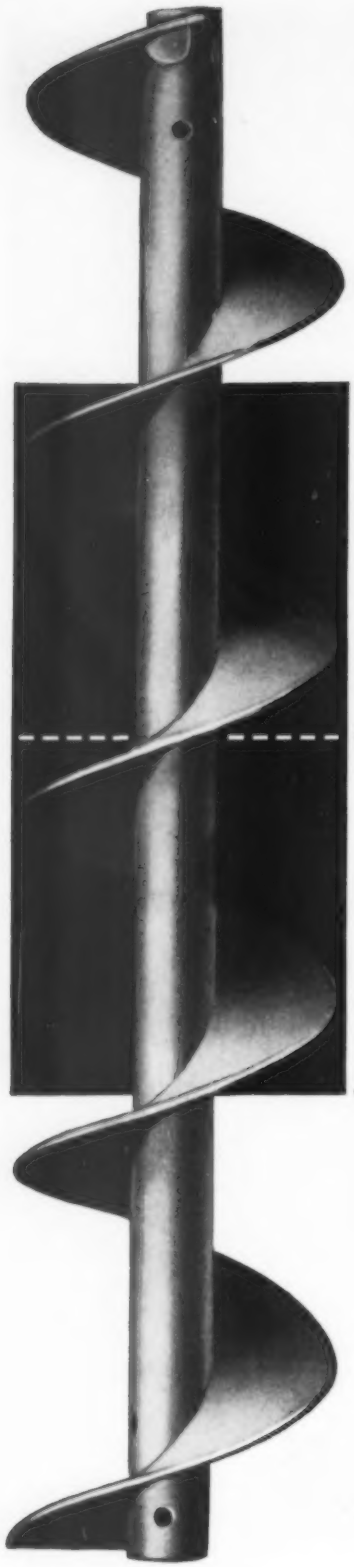
Barber-Greene has given a new meaning to belt conveyor economy. Built of standardized components, Barber-Greene Conveyors are delivered sooner . . . require less engineering . . . are erected faster . . . give top performance . . . and are more easily altered to meet changing or expanding requirements. Being standardized, repair parts are readily available—usually from the stock of your local distributor.

SHORT HAUL—Even the shortest Barber-Greene Conveyors are available in standardized components in the width and length to suit your needs. These small conveyors provide the economical way to handle the widest range of materials with greatest flexibility.

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

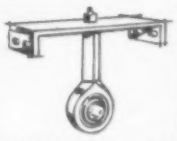


LINK-BELT is

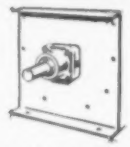
YOUR ONE SOURCE FOR ALL SCREW CONVEYOR NEEDS

your only source for many

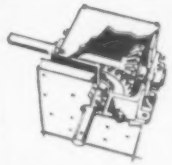
QUIK-LINK CONVEYOR SCREW. For ease in removal of conveyor section without disturbing other components. Can be furnished on Helicoid and Sectional flight conveyors.



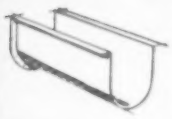
HANGERS have wide top bar with slotted bolt holes for easy assembly and alignment. Available with self-aligning ball bearing or with sleeve bearing in babbitt, hard iron, bronze or oil impregnated wood.



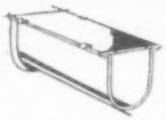
TROUGH ENDS of heavy steel plate are flanged at top and bottom. Furnished with babbitted, bronze or single or double ball bearing flange block, with or without trough end seal. Blocks are interchangeable.



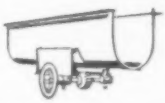
COUNTERSHAFT ENDS with ball and roller bearings or babbitted bearings, for right angle drive applications— common drive for two conveyors at right angles.



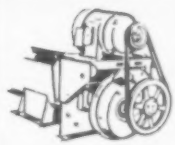
TROUGHS are accurately formed and jig-assembled. Steel angles securely welded to trough plate form top flanges. Can be made of stainless steel or other special metals to suit specific requirements.



SEMI - FLANGED, SPRING CLAMP COVERS are more rigid, easier to handle and form a tighter seal than plain type cover. Spring clamps are attached to cover—simplifies installation.



DISCHARGE SPOUTS AND GATES can be located anywhere along length of conveyor trough. Gates can be flat or curved —hand or rack-and-pinion operated.



DRIVES. Link-Belt shaft-mounted speed reducers are simple, compact — can be mounted directly on trough end plate. Motogears and Gearmotors with roller chain drives can also be furnished.

With seventeen basic screw designs, and a full line of components, Link-Belt can furnish anything you need from a single component to a complete line of screw conveyor.

As the foremost producer in this field, Link-Belt offers a range of new product improvements for profitable operation. Quik-Link conveyor screws, hangers, trough ends with ball or sleeve bearings, jig-welded troughs with new semi-flanged spring clamp covers—these and many more are cutting power demands and maintenance costs.

If you have bulk materials to be handled, it will pay you to look into the Link-Belt screw conveyor line. All components are available from stock. Call or write your nearest Link-Belt office or authorized stock-carrying distributor for Book 2989.

LINK-BELT

SCREW CONVEYOR

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15.230

New!

BOSTON CONCORD IMPERIAL STEAM HOSE with exclusive PATREX TUBE AND COVER plus STAINLESS STEEL BRAID

Two more major product advances by BOSTON establish new standards of performance . . . to meet your most exacting requirements. Here's why they give new Boston Concord Imperial Steam Hose unmatched strength, durability and economy.

PATREX—is the totally new compound from BOSTON research that gives tube and cover extreme heat resistance, amazing flexibility and increased abrasion resistance. Even at 450° F. Boston Concord Imperial shrugs off hardening and cracking that kills ordinary hose!

STAINLESS STEEL INNER BRAID—can't rust in the bore . . . absolutely protects against tube swelling! Two other steel braid barriers embedded in hose wall reinforce Patrex tube for maximum protection against burst. Completely controls pulsating saturated steam pressures up to 250 PSI!

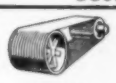
If you want the best, ask your BOSTON distributor about new BOSTON CONCORD IMPERIAL STEAM HOSE. The new golden cover tells you, "It's the most durable steam hose you can buy!"

BOSTON

BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.

INDUSTRIAL HOSE

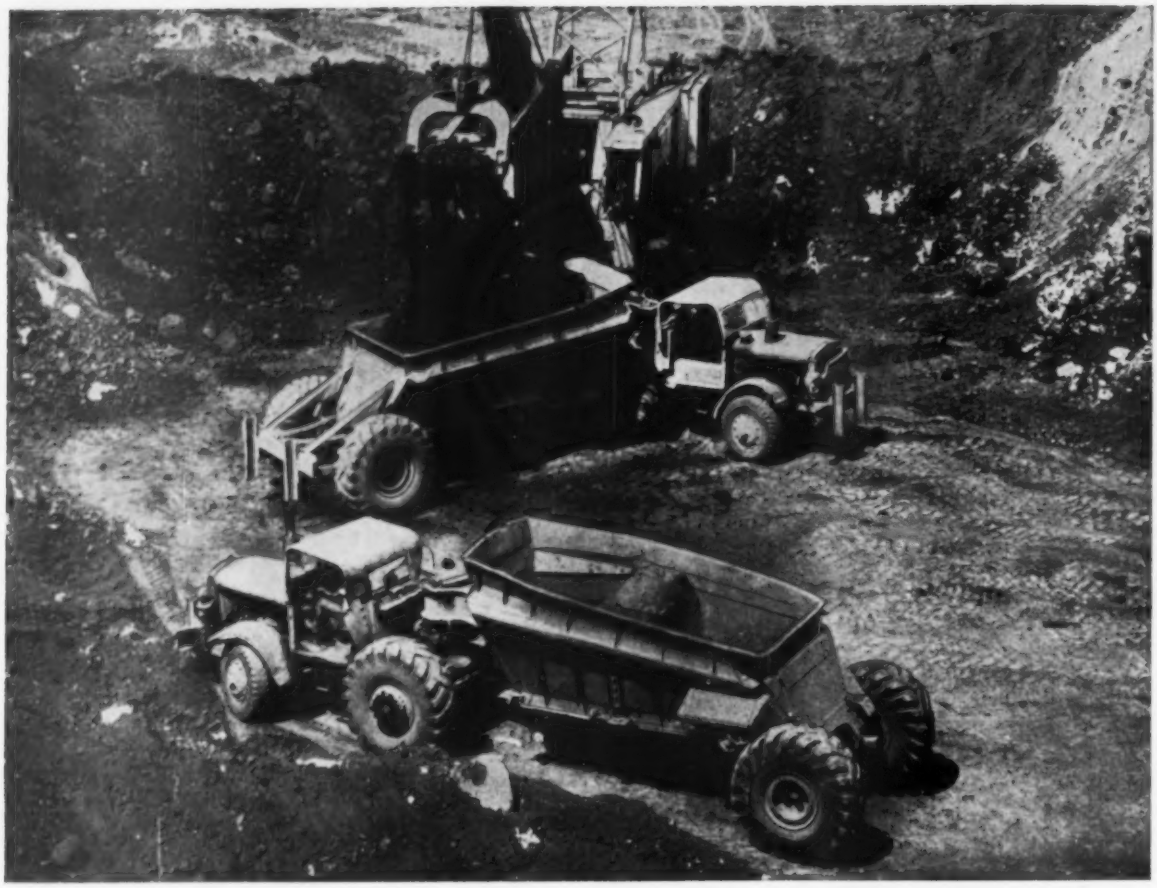
BELTING


V-BELTS

PACKING

MATTING

TAPE



5 years of dependable performance at big bauxite mine in JAMAICA

The mining and export of bauxite ore for the production of aluminum is a major industry in Jamaica . . . one that is making an important contribution to the economic progress of this historically famous Caribbean island.

Reynolds Jamaica Mines Ltd. is one of the largest operations, shipping over a million tons of ore annually to plants of Reynolds Metals Co. in the United States. The red ore is loaded by big diesel power shovels into a fleet of 15 Euclid haulers — eight Bottom-Dumps of 15 cu. yd. capacity, and 7 Rear-Dumps that carry 22-ton payloads.

Hauls from the pits to the stockpile area are up to 7000′ in length — over marl-base roads cut through the tropical country — with adverse grades up to 6%. The "Eucs" make the one-way haul in an average of six minutes and work around the clock on a 3 shift 5 day week operation to feed the kilns and 6 mile overhead tramways to the ship docks in Ocho Rios.

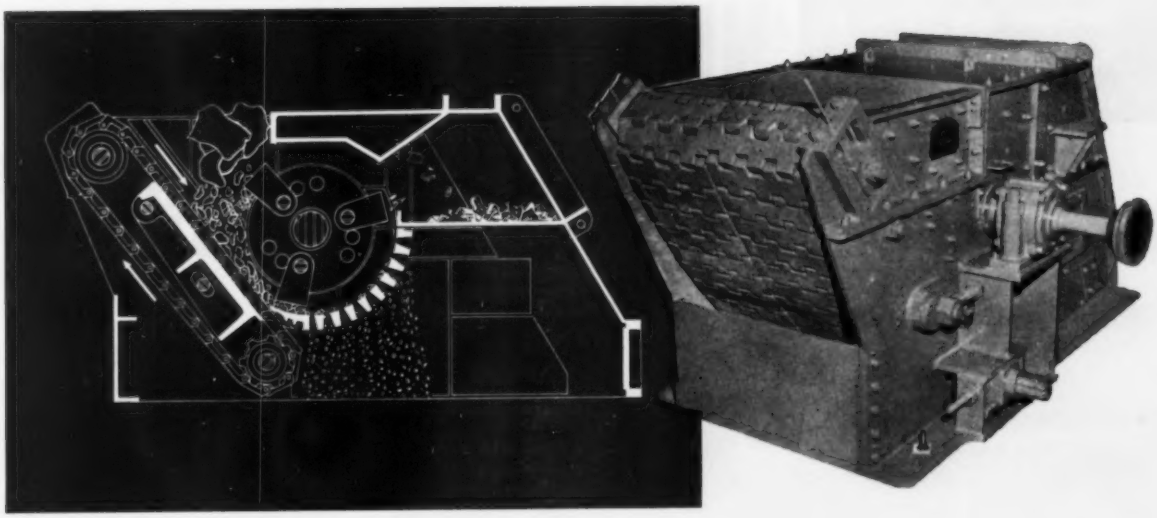
The Euclid fleet has been on this continuous, rugged operation for 5 years and has maintained full production requirements. Excellent maintenance, combined with the built-in dependable performance of Euclid design, has resulted in very high machine availability for Reynolds Jamaica Mines.

For helpful facts and figures on how Euclid equipment — rear-dumps, bottom-dumps, scrapers and crawler tractors — can cut costs on your mine, quarry or construction jobs, contact the Euclid dealer in your area or write:

Engineered to fit the job . . .
Euclids are your best investment

GM GENERAL MOTORS EUCLID

EUCLID
Division of General Motors Corporation
Cleveland 17, Ohio



FOR CRUSHING WET AND STICKY MATERIALS

If you're bothered with plugging and time lost getting the mill clear, here's the crusher that'll do away with your troubles. It's the Pennsylvania Non-Clog Hammermill. When in operation the traveling breaker plate carries the feed into the path of the hammers at a fixed rate of speed, making it impossible for the sticky feed to build up on the breaker plate out of reach of the hammers. In extreme wet feed conditions, where frequent clean-outs in the rear of the crusher may be necessary, the Non-Clog can be equipped with a self cleaning device. For complete information on the Pennsylvania Non-Clog Hammermill, send for bulletin 1052. Pennsylvania Crusher Division, Bath Iron Works Corporation, West Chester, Pennsylvania.

Pennsylvania CRUSHERS

Measure new 34 cu yd International Payscraper advantages

NEW power-to-payload hauling, jam-proof ejection.

You can heap up to 34 cu. yd. on a 2-axle International 295 Payscraper (or a 3-axle "495" model). You can operate as fast as 32 mph.—faster, even than smaller rigs of other makes.

You've got industry-topping, power-to-payload wallop in these giant new models. You get the sock of 375 high-torque turbocharged diesel "horses" from International's fuel-thrifty new DT-817 six-cylinder diesel. You get direct, push-button starting; all-altitude high-efficiency performance.

Exclusive bowl "with a flare" loads and keeps bigger heaps!

Exclusive new Payscraper tapered bowl design outcycles "slow loaders," "load spillers," and "reluctant dumpers." Widest of all cutting widths—131 inches—lets scraper wheels and pusher operate inside the cut, the best traction zone. Wide-cutting bowl and center rolling boil-in speeds heap loading. The tapered bowl is a superior heapholder even at the faster haul speeds. Obstruction-free bowl provides fast, positive jam-proof ejection.

Operators become full-time earthmovers!

Minute-stealing operating delays are eliminated, with speed-gaining, balanced design. The 295 Payscraper operator, for example, commands ample power and traction to pull out of 90° turns—even on soft fills—without time-losing back-ups.

The operator rides in cushioned comfort in a 16-adjustment seat that smothers bumps. He has reach-easy power brakes, "control tower" vision, flush deck safety. For the first time in big 2-axle scraper history, the operator becomes a confident, full-time, full-capacity dirt-mover!

From power to push-block—from fuel thrift to dirt on the fill—compare new giant-sized International Payscraper models to anything else on wheels. Note how they lead in turbocharged diesel horsepower. Match exclusive tapered-bowl scraper advantages against less-advanced design. Size up strength—ease of control—speed—capacity! See your International Construction Equipment Distributor!

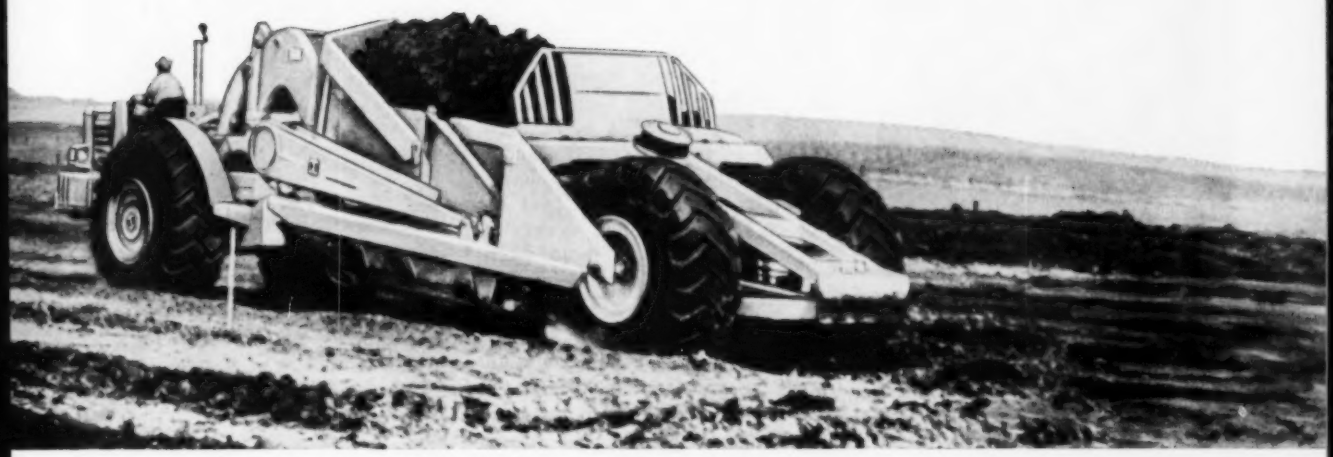
International® *Construction Equipment*

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Enter 48 on card, page 145

wallop...NEW speed loading,
..NEW full-power 90° turning



Three "295's" of a 6-unit Payscraper fleet, building new superhighway near Beloit, Wisconsin. Both the "295" and "495" feature International's fast-acting, finger-tip controlled model 280 cable control unit—built to give you high capacity; simple adjustments; low upkeep! Positive, forced ejection, plus gaping 98" apron opening, assures fast, positive dumping of all materials. Even gummy, barrel-sized blue clay chunks are quickly ejected—as this "495" view proves, on an operation of V. H & M Construction Co., Denham Springs, Louisiana.

new machinery

● Push-button hydraulic power positioning of the drill mast, increasing the drilling rate two to three times, is featured on a new self-propelled tractor-type rock drilling rig now available from the Thor Power Tool Company.

Finger-tip movement of five levers on the Thor No. TR-5 crawler rig enables the operator to power position the drill mast through ten hydraulic movements, permitting swinging, sliding, raising, and lowering of the mast to any position to meet any vertical, horizontal, or angular drilling requirement.

The TR-5 is described as a completely self-contained power unit which tugs an air compressor along behind it. Standard equipment on the rig includes a new Thor No. 140 4½-in. bore drifter, a power feed mast for 10-ft. steel changes, and a self-propelled tractor-type chassis driven by compact 8-hp. twin air motors. The hydraulic system is powered by an 8-hp. air motor interchangeable with the track motors. (354)

● A level indicator which visually shows the exact amount of material in a storage bin or silo is available from Linco Products. The devices are installed vertically in series inside the bin or silo and are connected to lights mounted either on the outside of the bin or on a control board. The indicator can be

wired to stop the loading mechanism when the material reaches a low point, preventing both overflow and emptying.

The units can be installed in any type of bin without modifications, and without drilling or cutting the wall. The manufacturer reports they work equally well with any size material from cement to 4-in. stone and can be made explosion proof. Any number of the devices can be used, depending upon the graduations required. (356)

● A new portable gravel grading and screening plant is being marketed by Pioneer Industries, Inc. The plant is engineered and designed to give complete portability, and is ready to operate within 30 minutes after arrival at the job site.

Completely hydraulic controls permit the production of 100 tons of gravel per hour, with the minimum of operating and maintenance costs. The grading plant offers maximum carrying capacity conveyor and 4- by 10-ft. screens. (355)

● An all-new type of V-belt introduced by the United States Rubber Company has a 40 percent horsepower rating increase over the company's previous offerings at no increase in price.

New automation processes at the rubber company's Philadelphia, Pa., plant have made possible this increase in horsepower rating.

The cords of each belt are processed through a cord treatment machine. In this improved method, the cords are normalized and impregnated with latex in every fiber, not merely surface-coated. Each cord is then built into the new line of belts under tension, with virtually error-proof electronic precision, to insure that each cord will pull its uniform share of any load. Such care results in higher drive capacity at less cost because fewer belts need be used and narrower sheaves are possible.

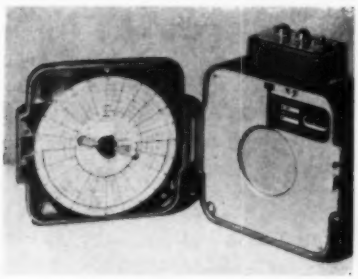
Also contributing to this higher horsepower line of V-belts is a unique method of molding devel-

and equipment

for further information use card on page 145

oped by U. S. Rubber's development department. Through this automated process, inner or outer imperfections are eliminated, contributing to longer belt life and smoother-running performance. This molding process also increases wear resistance by converting the covers of the new line of belting into a homogeneous blend.

These U. S. Royal V-belts are now available in all stock transmission widths and lengths. (357)



● A multi-purpose speed recorder designed to aid operators of off-the-road equipment who are seeking to reduce maintenance expenses and capital equipment costs is being manufactured by The Service Recorder Company. The new unit makes an accurate record of engine speed in revolutions per minute and pinpoints operations on one-day or three-day charts.

The r.p.m. recorder was designed especially for diesel powered units; however, models recording higher r.p.m. are also available for gasoline engines.

These units offer a visible engine speed control. An accompanying indicator is set to flash warning lights if the engine reaches too high or too low revolutions per minute.

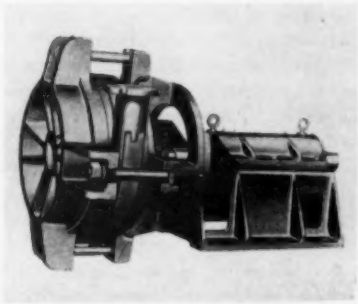
The same principal, with new concepts, was used in the development of the recording r.p.m. tachometer. The basic time record is made by a motion-activated stylus which traces narrow or broad idle and busy lines around a waxed chart. For the new r.p.m. speed recorder, another stylus linked to the tachometer drive inscribes an r.p.m.-graduated section of the 6-in. chart. The charts can be changed at the end of a shift or in three days.

The recorder can be mounted anywhere in the cab. The r.p.m. warning unit can be mounted on top of the recorder and attached to the dash, or mounted separately.

Another model of the speed recorder has a stylus linked to the speedometer cable and inscribes the actual miles per hour on a speed-graduated section of the chart. This unit also has a stylus which traces busy and idle lines as the chart turns. A third stylus reports the actual mileage covered. A push button speed selector can be set at predetermined speeds; when that speed is exceeded, a red warning light comes on. (358)

● Morris Machine Works is now marketing its Model 6 RXW centrifugal pump, featuring wider internal pump areas which permit greater ranges in certain cement and process applications.

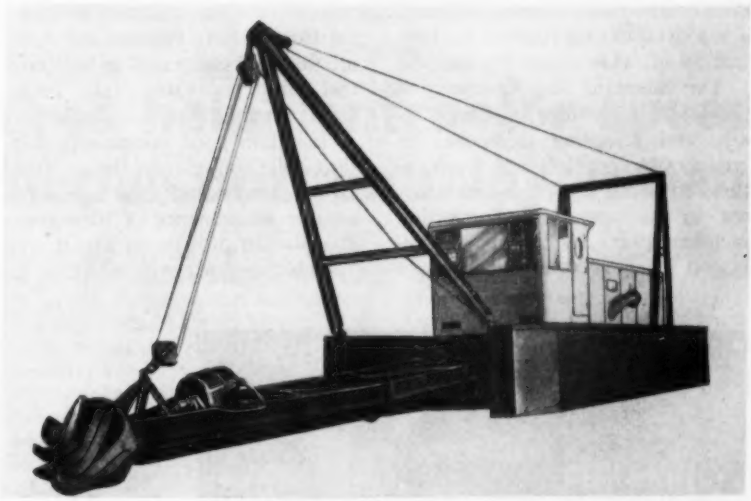
Ranging in size from 2 to 6 in., the type RX pump features a low



pressure stuffing-box and four-bolt accessibility for easy maintenance.

Liners on both sides of the impeller are renewable.

A heavy outboard radial bearing provides extra capacity for high overhung loads; suction and discharge nozzles swivel to meet requirements of any installation. (359)



● A new development of the American Marine and Machine Company is the Hydra-Drive portable dredge. This versatile new drive system, with variable speed swing and cutter, is said to give twice the power and has 80 percent fewer moving parts. A ladder with removable sections allows efficient digging at variable depths. An additional engine can be installed in the field to aid in pumping extreme distances or elevations without loss in capacity. The compact Hydra-Drive system enables this dredge to be assembled easily and ready for operation in two days. A complete finger-tip control system of all machinery is housed in an elevated control room.

Production model portable dredges are available from stock in 8-in. to 18-in. sizes. (360)

● It is practical and often necessary to test vibrating screen sections under actual operating conditions.

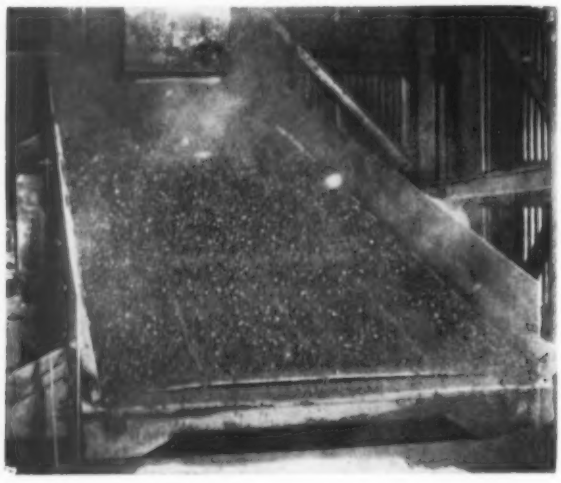
There is much to be derived from such field testing. When ordering vibrating screen sections it has always been a practice to use standard specification details. These include make of screen, size, screen cloth opening, and alloy required, wire diameter, hooked edge, inside angle of leg and length of leg, whether screen is electrically heated. Also, data on the material being screened, such as temperature maximum, wet or dry, and whether there is a corrosion or abrasion problem. Even with all this information, vibrating screen problems sometimes continue to harass wire screen users, particularly in critical applications. Frequently, under these conditions, it was necessary to change specifications to increase tonnage and minimize vibrator downtime, thus reducing overall wire screen cost.

Such a vibrating screen test is now in progress at The Standard Slag Company crushing plant at Lordstown, Ohio, where Cleveland Wire Cloth and Manufacturing Company's Cleloy screencloth is performing on a 5- by 14-ft. double-deck Seco—a four bearing unit with a top deck having four 42 in. long and 59 in. wide screen sections.

The Standard Slag Company is constantly searching for better alloys and screening techniques to combat the problems of temperature, abrasion, and corrosion inherent in its operation. Supporting member covers are checked and replaced when necessary and proper tension on the screens is maintained at all times.

Cleveland Wire Cloth asked Standard Slag to run tests to determine the best of a series of potential screens for this type of application. The combined efforts of Cleveland Wire Cloth and the research departments of two steel companies developed several new screen sections. Standard installed the first of these test screens on July 7, 1958. This was a Cleloy ⅜-in. square opening screen woven of .120 wire. From the first, this screen proved highly efficient—so much so that it has been in continuous operation, five days a week for over nine months, handling over 80,000 tons of hot expanded slag without a single breakdown. There is every indication that the screen will remain sturdy and operational for a total of 140,000 tons or more.

Exact results of this test will be available when completed. At that time, tests on the other two screens may be undertaken. (361)

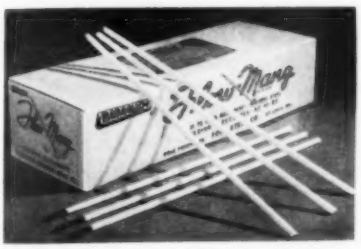


The Cleveland Wire Cloth Cleloy screen on a double deck Seco vibrator.

● Immediate vibration intensity records and a meter indication are provided by the portable Blastcorder, a product of The Geotechnical Corporation. Blasters can operate this field instrument to help control blasting within safe limits. Easily demonstrated to homeowners to maintain good community relations, the Blastcorder helps avoid costly delays and law suits. The routine maintenance of Blastcorder records can provide an expert with valuable evidence with which to defend the blaster if litigation develops.

The instrument indicates or records the peak acceleration of ground or structural vibrations. Knowing acceleration, blasters may either refer to the Bureau of Mines damage-safety index, or derive an index based upon local practice.

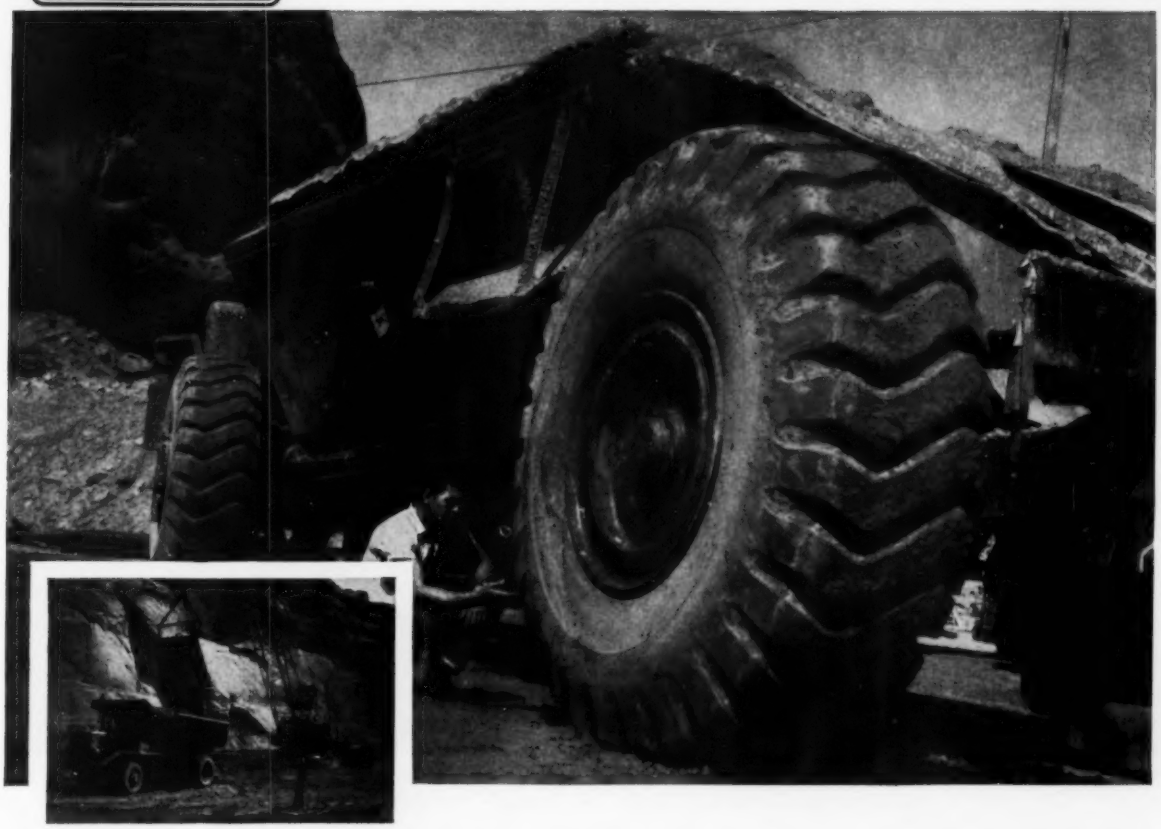
The Blastcorder is a self-contained, battery powered unit, protected by a tough Fiberglas case. It weighs 20 lb., and is 6x12x19 in. in size. One, two, or three pickups can be used. Acceleration is retained by a memory circuit and indicated on the meter—the operator may then press a button to print the acceleration on the 4- by 6-in. record placed in the slot. Spaces are provided on the reproducible record for entering operational data. (362)



● Flow-Mang welding electrodes, made of 13 percent manganese and 3 percent nickel, were developed by the Ford Steel Company to fill the need for welding electrodes which can be used even on difficult out of position welding jobs. Flow-Mang can also be used for welding high manganese steel to a low or high carbon steel.

This low-hydrogen type coating can be welded in a stringer bead or a puddle bead. It can be used on an a.c. or d.c. welder, and is available in four diameters from 5/32 in. to 5/16. (363)

B.F.Goodrich



B.F.Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

MIGHTY Glen Canyon Dam—world's third highest—will tower 700 feet above the bedrock of the Colorado River in northcentral Arizona. Before this massive project can be completed, millions of tons of rock, sandstone, aggregate and other materials must be moved over rocky haul roads.

To help keep this rugged job on schedule, Merritt-Chapman & Scott Corporation, general contractor, relies on B.F.Goodrich tires and service—uses 47 different types and sizes of tires on 23 different types of equipment that work 'round the clock. For example, M-C&S uses B.F.Goodrich Rock Service tires on belly dump trucks (above).

B.F.Goodrich builds the Rock Service for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F.Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

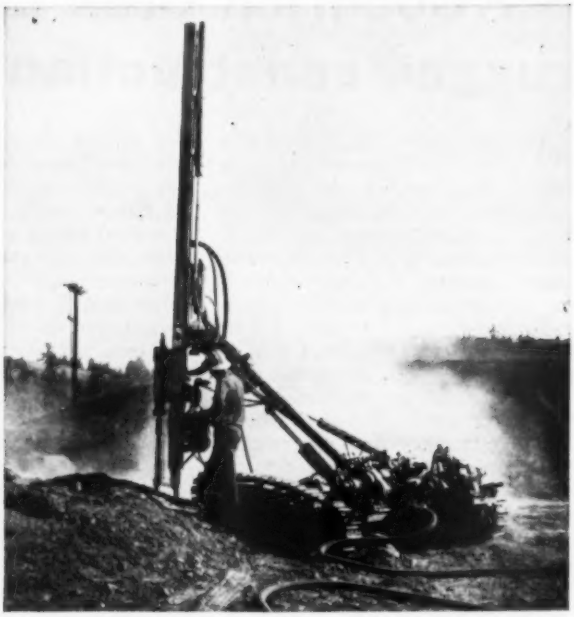
B.F.Goodrich *off-the-road tires*

HARD-HITTING DRILLS

THE SIZE, THE POWER AND

5 ½" hammer diameter—Here's deep hole drilling power that packs plenty of punch. Gardner-Denver DH143 fills the rock drill gap between wagon drill and rotary rig.

Tough and long-lasting—Gardner-Denver drill steel. Emergence from heat-treat furnace shows carburizing process that results in abrasive-resistant exterior and tough inner core.



First choice in crawler drills—The versatile swing-boom "Air Trac"®. Now available in a variety of models including stiff- and swing-boom units with complete hydraulic components.

FOR ANY ROCK BLAST

THE SPEED YOU NEED

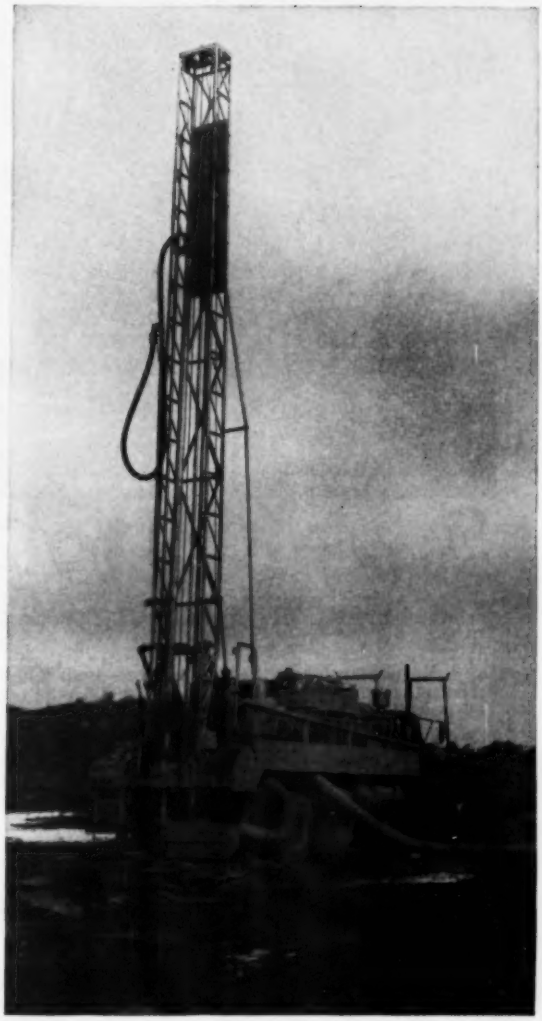
Select your rock drills from the most complete line of drifters in the field . . . GARDNER-DENVER

Gardner-Denver offers the most complete range of drifter drills known, thus assuring the right drill for your application, regardless of what it may be.

Talk to a Gardner-Denver blast hole specialist before you buy new rock drills. His experience can help you select the best blast hole plan and the right equipment for the job from Gardner-Denver's complete line of drills, rigs, steel and accessories.

MIDNIGHT MISSION

When unexpected developments demand immediate attention (additional equipment, essential parts, special service), a Gardner-Denver man is ready to go—any time, anywhere. And at Gardner-Denver, there's no substitute for men—our 100-year philosophy of growth.



In-the-hole power for rotary rigs—New Gardner-Denver "Mole-Dril"* rides with the bit through rock . . . delivers more striking power than any other drill of its size.

GARDNER-DENVER Since 1859 — 100 1959 YEARS

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

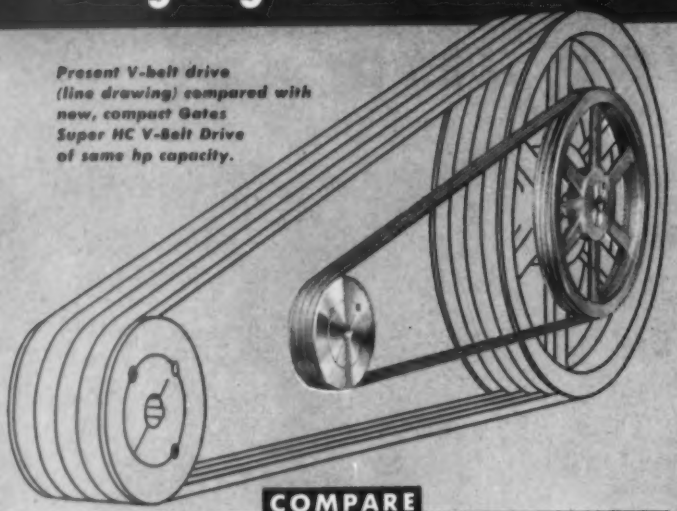
Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

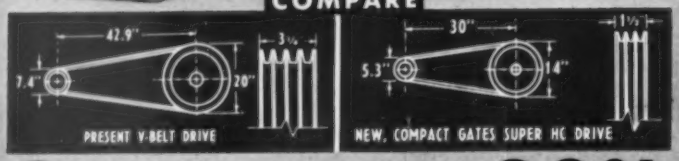
*Trade-Mark

Designing NEW DRIVES?

Present V-belt drive (line drawing) compared with new, compact Gates Super HC V-Belt Drive of same hp capacity.



COMPARE



Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

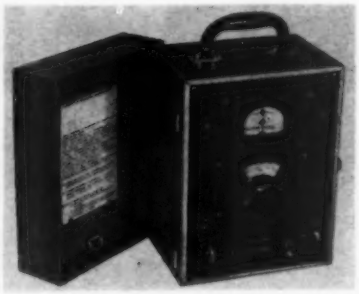
"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.
World's Largest Maker of V-Belts

TPA 439

Gates SUPER HC V-BELT Drives

Enter 56 on card, page 145



● Gravel deposits are quickly located with the new Vibroground Model 274-M soil survey instrument manufactured by Associated Research, Inc. Quick earth resistivity surveys provide soil contour profiles which indicate the location, depth, and extent of gravel and sand layers.

Designed for use with the Barnes Layer Method, the Michimho Vibroground makes earth resistivity soundings over a series of increasing electrode spacings. Data may eliminate preliminary test borings. **(364)**

● A 36-in. Hydrocone crusher which produces a greater output with less fines and reduced wear, maintenance, and space requirements has been introduced by the Allis-Chalmers Manufacturing Company. The crusher includes Hydroset control (hydraulic adjustment of the crushing head), and is available with feed openings of 7, 4, and 2 in.

The combination of accurately controlled size setting and short throw produces a higher percentage of usable product with less finely sized material than crushers designed with larger throws. Increased range of the machine's eccentric throws gives a tailor-made throw for each specific application.

The new bottom shell is flared outward to clear crushed products

from the chamber faster with less wear. The 736 size has a two arm spider designed to eliminate bridging of coarse feed.

A spiral bevel gear and pinion give this smaller crusher strength and life factors of much larger machines along with quiet operation. The pinion shaft now has anti-friction bearings and the spider bearing is of hour-glass design.

The crusher's concaves are now supported by a ring which is bolted to the top shell so that integral removal of shell and concave can be accomplished quickly and safely.

Tramp iron is automatically and quickly released by the new crusher. The hydraulically-adjusted crushing head automatically lowers to clear tramp iron and then automatically returns to the original setting. The new crusher releases faster because it operates at reduced hydraulic pressure. (365)

● In even the hottest weather operators of heavy equipment can drive their machines in the cool comfort of a new air conditioned helmet produced by the Jamieson Laboratories, Inc. The Jamieson Whitecap not only cools and dries the air, but filters out dust, insects, and other foreign materials. Inside the helmet, cool, clean air circulates around the head and face of the wearer. In humid areas, the system removes excess moisture from the air by condensation on the cooling coils.

The lightweight Fiberglas helmet is equipped with a face plate of clear shatter-proof plastic which provides protection against flying objects.

The unit can be easily moved from one piece of equipment to another. The small electric motor wires into any ignition circuit of 12 v. or more, or into a converted 6-v. system. (366)

Need REPLACEMENT V-BELTS?

Improved Gates Vulco Rope gives you 2 important advantages

1. 40% higher hp rating at no increase in price: This important cost-saving advance is the result of Specialized Research in the world's largest belt-testing laboratories at Gates. **As replacements on standard drives these V-belts with 40% more load-carrying ability give longer service life...reduce down-time, cut belt replacement costs.**

2. Concave Sides (U. S. Pat. 1813698): The sides of Gates Belts are concave (Fig. 1). When the belt is bent around the sheave, the concave sides fill out—become straight—for full, uniform contact with the sides of the sheave groove (Fig. 2). Uniform contact insures maximum pulling power...even distribution of wear...longer life.

Available in all sizes from your nearby Gates V-Belt Distributor listed in the Yellow Pages of your phone book.

When designing new drives
use Gates new Super HC V-Belts and Sheaves.
See opposite page.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.

World's Largest Maker of V-Belts

Gates

TPA 432

Gates Hi-Power VULCO ROPE V-Belts

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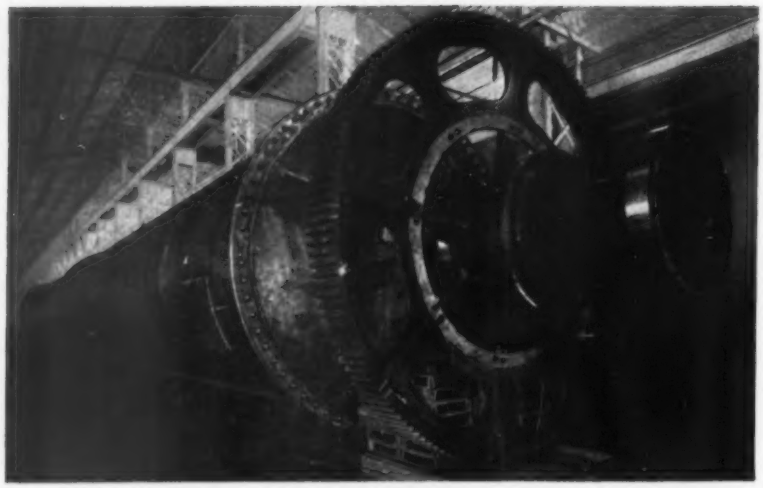


Ruggles-Coles

ROTARY COOLERS IN FOUR TYPES

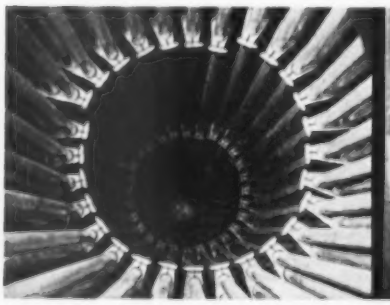
GAS-COOLED TYPE—Solids are cooled by direct contact with cooling air (atmospheric, or dried and refrigerated). Inert gases may be used in a closed system.

WATER-COOLED SHELL—Water is externally applied to the shell, either by sprays or by partially submerging the shell.

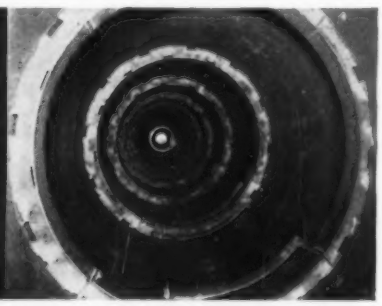
TUBULAR TYPE—Internal water-cooling tubes are assembled with the rotating shell, or installed as a stationary bank of tubes concentric with the shell. Alternately, the water leaving either of these tube sections may be used for supplemental spray cooling on the shell exterior.

DIRECT-CONTACT WATER—For rapid cooling from very high temperatures, water is sprayed directly on the hot material to utilize the latent heat of vaporization. Usually supplemented by secondary air cooling.

Each of these types has a particular area in which it is most economically applied. Write for further information.



Interior of a water-tube cooler. Longitudinal banks of tubes provide maximum cooling surface for minimum floor space.



Interior of partially-submerged cooler with gravity-controlled scrapers maintaining clean shell surface for high-rate heat transfer.

HARDINGE

COMPANY, INCORPORATED

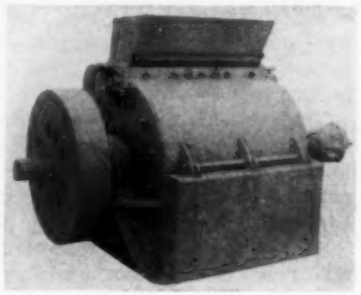
YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works

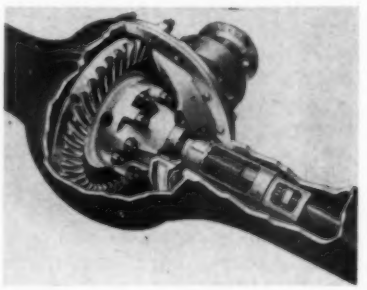
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco • Birmingham • Jacksonville Beach

Enter 58 on card, page 145

● A hydraulically adjusted hammermill, the Model 4034, has been introduced by Pioneer Engineering, Division of Poor & Company, Inc.

All wearing parts on the hammermill are cast from Hadfield manganese steel. Breaker plates are reversible and adjustment is simplified by means of hydraulic jack and shims. Grate bars, with size openings available from ¼ in. to 3 in., can be arranged in various combinations to produce the desired product. A hinged cover section permits quick and easy access to the crushing chamber for changes or adjustments. (367)



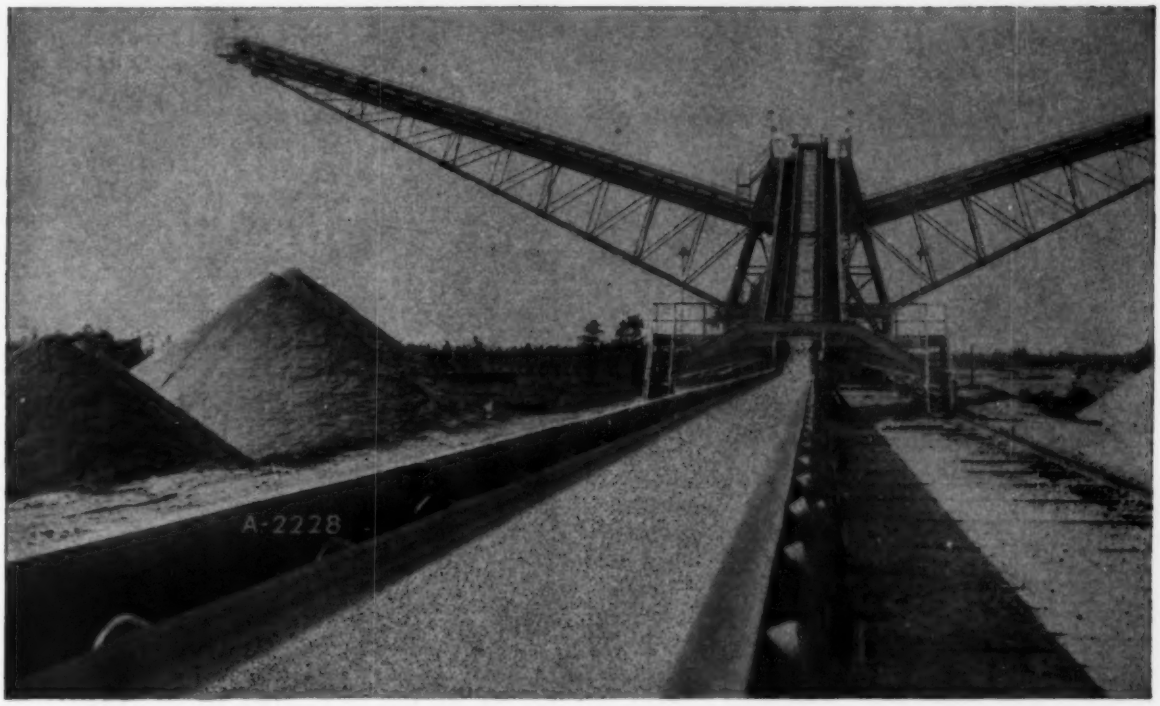


● Of interest to operators of both off-the-highway and over-the-highway units is a traction-improving device recently introduced by the Transmission and Axle Division of the Rockwell-Standard Corporation. This traction equalizer imparts to the wheel with the best road adhesion a substantial increase in tractive effort. It is claimed that this device will propel a vehicle even if one of the driving wheels is completely off the ground.

Because the unit is continually engaged and does not depend on the driver for activation, it is automatically effective whenever one wheel tends to turn faster than the other.

With multi-drive axle vehicles, each axle may be equipped with the unit. (368)

STEPHENS-ADAMSON



BELT CONVEYOR SYSTEMS...lower handling costs!

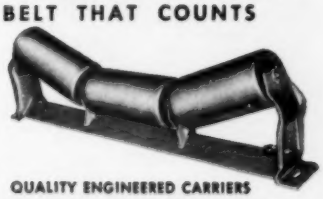
Nearly a half-century ago STEPHENS-ADAMSON engineered its first sand and gravel conveying system. Today, that system is not only performing efficiently but the company is a loyal S-A customer.

Since that first system was installed STEPHENS-ADAMSON engineers have engineered and built innumerable rock products handling systems — each calling for certain innovations, because as you know — every operator's handling problem is a little different. The final result with each new S-A installation is the same however . . . bulk materials are handled at the lowest cost per ton.

Profitable conveying of bulk materials over the belt is dependent on what's under the belt in quality-engineered conveyor components. S-A conveyor components contain features — (many of them patented) — found in no other conveyors on the market.

Write for bulletins 355 & 558 covering belt conveyor components.

IT'S WHAT'S UNDER THE BELT THAT COUNTS



QUALITY ENGINEERED CARRIERS

S-A manufactures a complete line of carriers, quality-engineered with features found in no other carrier regardless of price.

S-A CURVE CROWN® PULLEYS

Maximum belt training effect with minimum belt stretch and wear are provided with exclusive S-A CURVE CROWN design.

WRITE FOR BULLETINS 355 and 558 on Carriers and Pulleys

S-A
MATERIALS HANDLING PRODUCTS
SEALMASTER BALL BEARING UNITS

ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 20 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

● Described as new from base to boom, a ¾-cu. yd. (12½- to 30-ton capacity) LS-78 shovel crane was recently introduced to the market by the Link-Belt Speeder Corporation.

Speed-o-Matic power hydraulic controls and a split panel control-stand for a better work-view of below grade excavating are features. Main friction clutches are all two-shoe internal-expanding and completely interchangeable. Gasoline or diesel engines are available for the power plant.

"Full Function" design of the upper works employs separate sets of shafts, gears, and clutches that provide a separate power flow for each machine function. On a machine with independent swing-and-travel, all operations are completely independent of each other and are not restricted with the changing of front-end attachments.

For ease of serviceability, all horizontal shafts are involute splined The traction shaft of the lower works is removed in sections through the sides.

Three lowers, all offering hydraulic steering, are available, varying in gauge from 7 ft. 10 in. to 9 ft. 8 in., and in length from 11 ft. 4 in. to 13 ft. 7 in.

Each crane attachment (lifting crane, clamshell, or dragline) features a two-piece angle-type, box-lattice boom. The shovel attachment features an independent cable crowd and retract arrangement. The gooseneck hoe boom has a bucket designed to operate with a variety of side cutters, or can be used without for minimum cutting width. **(369)**

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AUTOMOTIVE HARDWARE CO. AH FASTENERS World's Largest Mobile Distributors & Manufacturers

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The world's largest mobile distributor of screws, nuts and bolts, fittings and automotive hardware provides a service that cannot be equaled as to flexibility, mobility and dependability. If you are the purchaser of screws, nuts and bolts, fittings and automotive hardware and if you are interested in the finest quality merchandise at the greatest economy to your company, you *must* consider our service and hear our complete story as to how we can save TIME, EFFORT AND MONEY for YOU.

We identify and label your present inventory — FREE
We sort and arrange your present inventory — FREE
We establish and stock your new inventory — the finest quality merchandise.
We install our exclusive FLEX-A-BINS as needed — FREE
(which obsoletes all other types of stocking methods)
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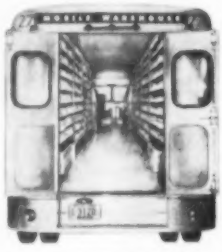

We make regularly scheduled calls — providing all the above services — anywhere in the United States, to your plant or field location, single or multi-plant operation, and our representative when making these calls, will provide all the FREE services and leave your shop completely in order and stocked to capacity as required. No other organization can provide this service. Write for complete information as pertains to your business.

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And regardless of weather or roads,
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Enter 60 on card, page 145

Enter 61 on card, page 145 →

New Ford Industrial Tractor with Super-Duty Loader

LOAD WITH FORD *You'll Be a One-Man Work Gang!*

- Full length load-carrier frame.
- 7000 lb. capacity "H" beam front axle assembly.
- 11,000 lb. capacity grille-bumper.
- 172 cu. in. "Red Tiger" engines, gasoline or diesel.
- Choice of transmissions including "Select-O-Speed."
- Full hydraulic power steering.
- "Third hand" foot throttle.
- Tire and wheel options for every job.
- Loader uses equipment hydraulic system; 3-point hitch system free for other attachments.
- 5/8, 3/4 and 1 cu. yd. tread width buckets.
- 2500 lb. lift capacity; 5500 lb. breakaway.
- Cushioned seat with back rest; wide open visibility.
- Exclusive bucket position indicator.

Ford Motor Company

COPYRIGHT 1959, FORD MOTOR COMPANY

New Ford Industrial Tractor with 12 ft. Backhoe

DIG WITH FORD

You'll Be a One-Man Work Gang!

- Choice of Ford 10 ft., 12 ft., 14 ft. Backhoes.
- Rugged construction, exclusive design for superior performance on any digging job.
- Backhoes use tractor's equipment hydraulic system; quickly attached or detached to free 3-point hitch.
- Clamp-type hitch; no pins or bolts.
- Cushioned seat with back rest; wide open visibility.
- Wide 10′ stabilizer work stance; 77″ transport width.
- Superior reach, digging depth, undercutting, truck loading with all models.
- Many buckets; unmatched capacity.
- Full-power 185° swing.
- No delays, no wandering in swing system.

These of course are only highlight features. See Ford, try Ford at your dealer's, or for detailed specifications write Industrial Tractor and Equipment Department, Ford Motor Company, Birmingham, Michigan.

Ford Motor Company

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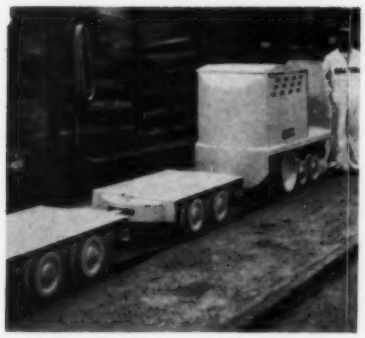


● A miniature railroad, consisting of a half-pint rail tractor driven by a storage battery and two baby trail cars, has been designed by the Easton Car & Construction Company. Running on 24-in. gauge track, the train can start from a standstill on an 8-ft. curve with each trail car loaded to full 4-ton capacity. It builds up speed as high as 300 f.p.m. on the straightway.

In its first installation, the railroad hauls 8-ton loads of grinding balls from storage to the ball mill. (370)

● A new self-unloading dry bulk materials transport, designated as Cement Transport Model BMC-T, highlighted a series of 14 new model trailers and truck bodies recently introduced by Dorsey Trailers.

The BMC-T has three 20-in. fill hatches with water-tight covers. Its twin screw discharge system unloads at the rate of 5 bbl. per minute. To dislodge lumps and prevent bridging over conveyor shields, the screws are reversible and each has four air pads. Two stage drives permit discharge of the rear portion of the load before front screws are engaged. Single point 14-in. downspout and rubberized nylon discharge boot are also standard.

The unit is hydraulically powered through a tandem pump operated from the tractor power-take-off. With a 25-hp. air-cooled engine, which is offered as optional equipment, it can operate with any tractor.

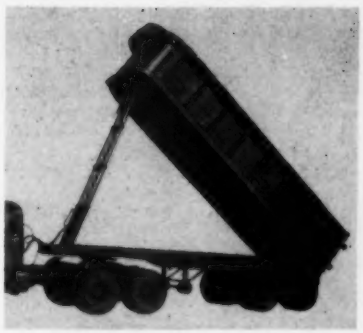
Other standard equipment includes 20,000-lb. axles; 16½-in. air brake; steel spoke wheel; two-speed, vertical, removable landing gear; 10:00 x 20, 12-ply tires; rear fenders; and ICC lights plus reflectors and rear turn signals. (371)

● Two new mobile electric cranes which can set their own outriggers and be ready to lift capacity loads within 30 seconds have been introduced by R. G. LeTourneau, Inc. Known as the Series R-30 and the Series R-45 cranes, they have capacities of 30 and 45 tons respectively. All operating functions of both are electrically powered.

Individually operated, electric-powered outriggers form a level lifting platform on varied terrain, and are controlled from within the operator's cab.

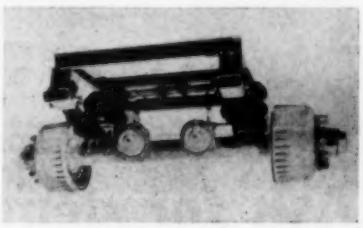
Variable speed regulation of d.c. motors which power the hook line and boom swing provides smooth control of capacity loads. Added load handling accuracy is achieved by powered down-travel of the hook line, and positive 360-deg. power control of boom swing.

There are no friction clutches; smooth power application is actuated through finger-tip operator controls. Maximum load-handling safety is provided by electro-magnetically released, spring-loaded disc brakes on the control motor for each powered function. A single finger-tip switch on the operator's panel controls electric-power steering and provides fast maneuverability. Individual d.c. electric motors are geared directly to each wheel. (372)



● Jacob Press' Sons, Inc., recently introduced a series of semi dump trailers available in 18- to 24-ft. lengths, with capacities from 16 cu. yd. and up.

Among the features in these new units are double cap top rail; I-beam frame; improved hoist packing; choice of front mount or underbody telescopic hoist; and rear cross members and rear standards welded to one integral unit, constructed from steel plant. (373)



● Equal Ride Trailer Suspension system, introduced by the Western Unit Corporation, combines steel leaf springs and air cushions to provide a smooth, level ride for trailers, whether loaded or unloaded.

In use, the leaf springs and the air cushions team up to carry the trailer and the payload, absorbing road shock, sway, and brake reaction. When running empty, all air is automatically released from the air cushions and the trailer weight is carried by the leaf spring assembly.

The Equal Ride suspension unit is a completely engineered package, ready for immediate installation, and includes sub-frame and all required piping. The manufacturer states that perfect axle alignment is readily attained by use of single point adjustments at each spring.

Made for use with different weight trailers, the units have 18,000- to 20,000-lb capacities. (374)

Schramm Pneumatractor-mounted Rotadrill is the most modern drilling rig ever designed for drilling 4" to 4½" size blast holes in quarries. If you've never seen it work, or tried it yourself, write today for a demonstration. Available: **gasoline or diesel.**

ANXIOUS TO SEE NEWEST, MOST MODERN DRILLING TECHNIQUE?

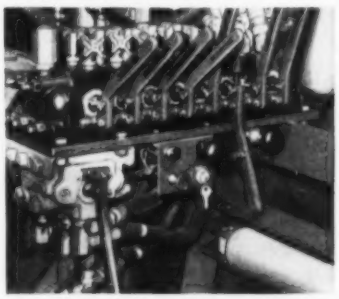
Ask for demonstration

Now, see the newest, fastest, most modern drill rig ever built—Schramm Rotadrill. Learn how your blasting costs can be lowered because of Rotadrill's faster drilling rates and larger diameter blasting patterns. Investigate the greater profit potentials which result from Schramm's more economical drilling methods.

Make arrangements, now, for your own personal demonstration. Simply contact your local Schramm Dealer who will make arrangements, or write on your company letterhead to Schramm, Inc., West Chester, Pa. If you would just like to know more about the Schramm Rotadrill before seeing a demonstration, write for your copy of Bulletin PR-56A.

See the Yellow Pages for local Sales, Service and Rental of Schramm Rotadrills—Truck, Pneumatractor, "Do-it-yourself."

Rotadrill has standard 17′ feed and is also available with 12′ and 22′ feed. "Lazy-susan" pipe handling device makes steel changes faster, safer than ever.



Convenient, simple drilling controls are mounted in one bank for one-man operation. Finger-tip controls are located next to mast for easy operation.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

640 North Garfield Ave. • West Chester, Pa.

Enter 64 on card, page 145

Washington News

(*Continued from page* 11)

This danger probably eliminates civil rights as the area in which the Democratic record will be made, leaving only labor reform.

Cracking down on labor unions is hardly a role in which most Democrats can feel comfortable. Most of labor's current strength is due directly to that party's sympathetic help. Thus, the Democrats again find themselves in the kind of dilemma which may prevent any action. Most of the Democrats would like to pass a labor reform law which would look tough but would not be any tougher than the AFL-CIO leadership is ready to accept. However, it is unlikely that such a law could command enough support to pass.

Internal problems such as these among the Democrats have become painfully apparent and are providing encouragement to a Republican party only recently demoralized.

Labor Developments

(*Continued from page* 13)

During the labor shortages of World War II, however, time and one-half and double time for working long hours became standard practice.

For some time, there have been situations in which similar premium pay was applied not only to working excessive hours, but also to working inconvenient hours, such as on holidays. When, after the war, Saturday and Sunday became the accepted days of leisure, it was a relatively short step to take to regard working on those days as inconvenient and therefore requiring premium pay. The only exception was in case the basic job required such work; but, as has been seen, the current trend is toward premium pay on Saturday and Sunday, as such, even for jobs in which the necessity for working on those days is fully acknowledged.

There is a movement afoot toward further reduction of the workweek. In view of the above history, it should not be difficult to figure out what form the reduction will take—premium pay will be required for work on the fifth day or on the eighth or even seventh hour of the work day. Some labor agreements already contain such provisions.

Enter 65 on card, page 145 →

Has no springs, rides on Hydrair*

— With Haulpak's exclusive air-hydraulic suspension system, you completely eliminate maintenance and repair of springs. 4 Hydrair units cushion against loading and travel shocks . . . keep unit riding level over bumps and holes. LW Haulpak also has exclusive LW power-transfer differential — permits unit to haul over wet, muddy areas that bog down competitive trucks.

You'll haul more tons per hour at lower cost . . . with

LW Haulpak®

Low loading height — (only 10'1" on 32-ton size) and large top opening (14'5" x 11') makes it easy to load LW Haulpak *fast*, without spillage.

This revolutionary off-highway truck gives you highest output at lowest ownership and operating costs. You get these profit-making benefits because the all-new, fully-proven LeTourneau-Westinghouse Haulpak is built *specifically* for rugged, heavy-duty hauling. It is not a "beefed-up" highway truck . . . nor does Haulpak have the maintenance problems common on ordinary haulers.

Notice, for example, Haulpak's rugged "V"-shaped body. This exclusive LW design gives you *bonus* yardage within a short wheelbase . . . makes for easy loading . . . and provides a low center of gravity for exceptional stability.

LW Haulpak's short, 130-inch wheelbase gives you unusual maneuverability (makes non-stop U-turn in area only 44'6" wide . . . shortest turning radius of any big off-road truck). You spot, swing around, back up and dump *fast* . . . you eliminate most maneuvering delays, complete faster cycles. You have "feather-touch" power-steer, too . . . system is located high behind bumper, well protected from damage.

And, very important, time lost for maintaining your Haulpak is practically nil. It needs *no* daily lubrication. The entire Haulpak lubrication check — *needed only at 500-hr intervals* — consists of just 4 easily-reached grease fittings. In addition, LW Haulpak's various parts and assemblies — some of them tested and proved by *millions of hours* on LW Tournapulls® all over the world — are much stronger than those used on competitive haulers.

22, 27, 32-ton sizes

Ask us for detailed specifications on the size Haulpak that fits your needs. Available in 22, 27, and 32-ton sizes . . . 290, 335, and 375 hp. Compare its features with any other truck in the industry . . . you be the judge!

*Trademark HP-2155-G-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

"At AMERICAN AGGREGATES CORPORATION

we use Jeffrey Jigs to meet state specs"

Two Jeffrey jigs, each processing more than 150 tons of aggregate per hour, are located in this building at American Aggregates' new "push-button" plant at Columbus, Ohio. A third unit was recently purchased in lieu of a heavy-media separation system at one of their other plants.

Mr. Elmer Warner, plant superintendent explains: "Meeting rigid state specifications for concrete aggregate is no longer a problem with us here at the Columbus, Ohio plant. In previous operations we were hard-pressed in meeting 'specs'.

"A year ago we bought our first Jeffrey jig to help us meet state requirements allowing only a maximum of 5% deleterious material. This jig, the first to be used in this area for separation process, held deleterious material to well below the maximum allowed.

"You can see why we recently installed our second Jeffrey jig here . . . and why we bought another for our plant at Kalamazoo, Michigan."

Jeffrey jigs produce premium quality concrete aggregates for only a few pennies per ton of material processed. That's the kind of profitable performance that pays off in this industry.

Jeffrey engineers are qualified to advise you on sand-and-gravel separation or processes involving jigging of coals or ores. Get in touch with The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

How Wisconsin pit strips overburden fast and at low cost

Working along edge of deep pit, 138-hp D Tournapull loads an average of 7½ yds. of clay and sand in 44 seconds. Fast-acting electric controls, big air brakes, and high traction tires assure operator and machine safety.

The Wilson and Shipler Limestone Pit at Beloit, Wisconsin, produces crushed stone, which is sold as subbase or top dressing for roads. As their mining activity expands, so too, the job of overburden removal becomes larger and costlier. But owners of this Wisconsin pit find that there is a sure, modern way to handle the job fast and at low cost. They use a speedy, rubber-tired LeTourneau-Westinghouse D Tournapull® 9-yd. scraper. Here's how this pivot-steer dirtmover performs:

Loads 7½ yds. in 44 sec.

Removing sand and clay from limestone formation, scraper is push-loaded with average of 7½ yds. in 44 sec. — according to co-owner Carroll Wilson. Load, haul, spread and return cycles of 2200′ are completed in 3 min. 42 sec. That's 13 trips per 50-min. hour. Working 10 hours a day, this single D Tournapull strips an average of 975 yds. of overburden daily.

Earns extra profits

When stripping work is completed Wilson and Shipler don't let their Tournapull scraper sit idle. They use it for miscellaneous dirtmoving assignments around the pit . . . or they send this mobile scraper out to handle nearby land-leveling contract jobs for extra profit.

You be the judge

Let us arrange to demonstrate the D Tournapull scraper at your pit. Time its cycles, measure its performance for yourself. We're sure you'll find this 138-hp LeTourneau-Westinghouse unit a good producer on overburden work, and a worthwhile "handyman" for clean-up work, haul-road construction, drainage improvement, and other self-loading jobs. Call us for full details.

DP-1797-QMJ-1

Reduce equipment inventory

For less than ¼ of the cost of the Tournapull with scraper, you can get an 11-ton Rear-Dump trail-unit to interchange with original scraper. You'll then have a two-way high-production tool to help you reduce pit hauling costs and equipment inventory. Other trail-units to increase prime-mover usefulness also available.

LW

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

SMIDTH

Grinding Mills

Ball Mills and multi-compartment Unidan Mills for wet and dry, open and closed circuit grinding and airswept Tirax Mills for simultaneous drying and grinding. Auxiliary equipment for mills. Special features include the Smidth slide shoe bearing and the Symetro Drive.

↓ Unidan Mill, Symetro driven, with one slide shoe and one trunnion bearing.

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Safety Has Another Bad Year

SAFETYWISE, the nonmetallic minerals industries as a whole made a very poor showing in 1958 for the second successive year, according to the latest edition of the National Safety Council's statistical yearbook *Accident Rates,* which is just off the press. There were sharp increases in the accident severity rates in all four categories in this field, and much smaller decreases in the frequency rates.

Industry in general just about held its own in 1958, according to the Council. Workers employed by member companies had a slightly lower accident frequency rate but a slightly higher severity rate than in 1957. The frequency rate, based on the number of disabling injuries per 1,000,000 man-hours, was down from 6.27 to 6.17; the severity rate, based on the days lost from work per 1,000,000 man-hours, was up from 740 to 744.

THE cement industry, which has for many years led the nonmetallic minerals industries in safety, continued to lead in frequency but not in severity. Its accident frequency rate rose from 2.81 in 1957 to 3.30 in 1958. Its severity rate rose from 1,282 to 1,428. This dropped cement from sixth to seventh place among the 40 industrial groups in frequency and from 32nd to 35th place in severity.

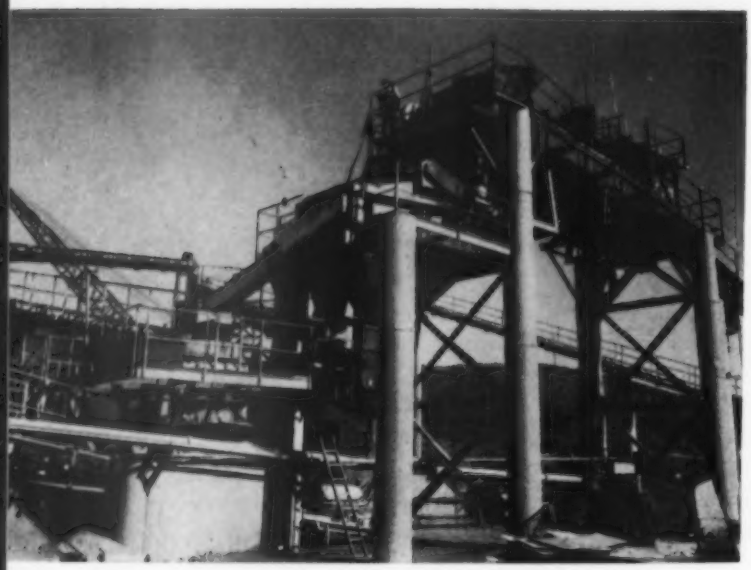
The only competition to cement in this field is from the clay and mineral products industry group, which was a poor second to cement in frequency but ahead of it in severity. This group includes brick and tile, pottery, concrete products, ready-mixed concrete, gypsum products, lime, slag, and miscellaneous mineral products. The 1958 rates for this group were 9.14 for frequency and 1,110 for severity, compared to the 1957 rates of 10.89 and 785. This gave the new group 30th place in frequency and 33rd place in severity, compared to 31st and 27th in 1957.

The quarry group made a poor showing for the second year in succession. It just held its own, with a frequency rate of 11.95 for both years. Its severity rate, however, was up sharply from 3,365 in 1957 to 4,168 in 1958. As a result, this group held its unenviable 33rd place in frequency and its 39th (second from last) place in severity.

The category of mining, other than coal, includes the underground mining of metals and nonmetals, with the metals predominating slightly. This group had a frequency rate of 15.23 in 1958, a sharp drop from 20.45 in the preceding year. In severity, however, there was an even sharper increase from 2,869 in 1957 to 3,950 in 1958. As a result, this group rose from 37th to 36th place in frequency and held its 38th place in severity.

The above figures are for only 844 nonmetallic minerals producers, but they give a good indication of trends within these industries. Actually these records are undoubtedly far better than those for the entire industry in each category, if such figures were available, as members of the National Safety Council are obviously the more progressive and safety-minded producers in each group. They can do better than they have; but the vital need is for more attention to safety by the many thousands of other companies.

Walter E. Trauffer



These cone crushers and screens are in the first processing stage of the gravel sizing and washing department.

Output of Used

By HARRY F. UTLEY

ANOTHER ON THE SPOT REPORT

SAN DIEGO, Calif., obtains the major share of its construction aggregates from Mission Valley and its tributary canyons north of the city. The numerous sand and gravel processing plants in this valley (named for the southernmost in the chain of early California missions—Mission San Diego de Alcala) operate on the valley floor. Most of the operations work deposits higher up in the surrounding hills, where there are ample reserves of good gradation.

The newest aggregate-producing facility in the area is owned and operated by the Daley Corporation in Murphy Canyon, a firm which has long been identified with the general contracting and paving business in the extreme Southwest. Its new plant can turn out more than 500 t.p.h. of washed and screened material, yet it markets none of the product strictly as gravel or sand.

Instead, Daley utilizes its materials output in the asphaltic mixtures which it produces, in dry-batched concrete to supply the paving machines on street- and road-building jobs and in soil-cement mixes which it prepares in a special plant right on the premises. It can, of course, also turn out crusher-run road-base material in high volume upon demand.

Perhaps the most interesting feature of the new facility is a mammoth reclaiming tunnel 500 ft. long running beneath the finished-material stockpiles. This reinforced-concrete tunnel, 8 by 10 ft. in rectangular cross-section, houses four separate belt conveyors, two on the upper level and two below. Two of these belts run northward, delivering aggregates to a pair of hot-mix asphalt plants. The two lower-level belts run in a southerly direction, carrying gravel and sand to the bins of a concrete batching plant and the soil-cement pug-mill plant.

Remote control, interlocked processing equipment, and multiple surge-piling make for a high degree of flexibility in operation and high output per man-hour. Extensive

The hopper and primary crusher are on a hill above the Daley plant. Sand and water from primary screens are carried by pipeline (lower right) to the sand processing department.

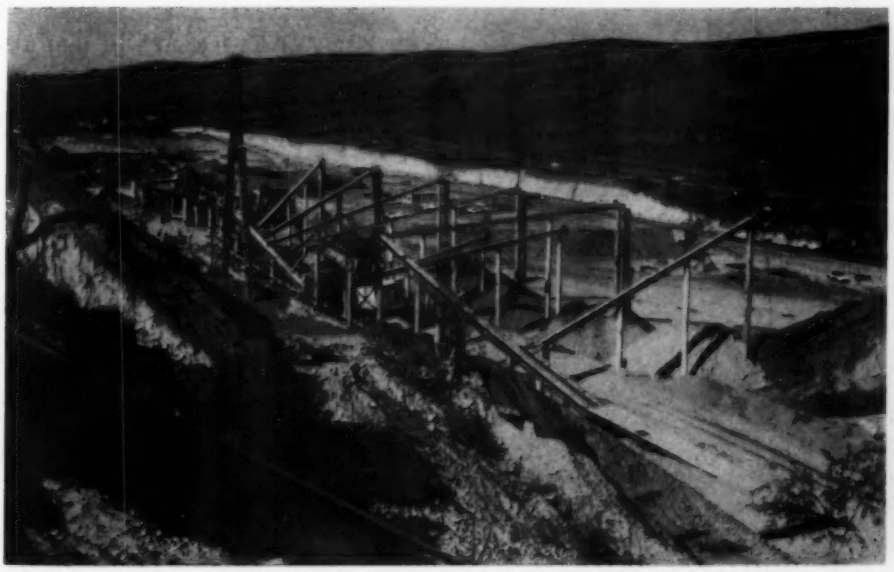
■ **Daley Corporation's San Diego operation has 4-conveyor reclaiming tunnel feeding to two asphalt plants at one end, to a dry-batch and a soil-cement plant at the other**

New 500-T.P.H. Gravel Plant Entirely in Products

use is made of that highly efficient material-handling device, the belt-conveyor, and more than 10,000 lineal feet of Thermoid belting has been utilized in the intraplant transport system. There isn't a single power pole on the premises; all wiring is carried below ground and spot-transformed as needed from the 13,000-volt transmission lines to feed the 480-volt motors.

Considerable stripping is required to expose the deposit in the ridges above the plant, since the overburden at times runs 40 ft. thick. Over the years this waste material has been deposited as fill on the canyon floor to prepare a level site for the new plant and to divert the course of Murphy Creek. Caterpillar tractors and scrapers are used to strip the spoil and excavate the pit-run aggregates. Teamed with tractor bulldozers fitted with H & L corner adapters, these same units deliver this material to a corner hopper which feeds a Pioneer 15- by 36-in. jaw primary crusher. A bar grizzly rejects the occasional boulder over 7 in. in size.

A Syntron grizzly-feeder just ahead of the crusher by-passes the minus 2½-in. material, while the crusher breaks the grizzly oversize to approximately 2½-in. top size. Both the crusher product and the feeder throughs are next carried by a short belt conveyor to a Symons 4- by 14-ft. double-deck spray-



This view of the gravel processing section shows its numerous stacker conveyors.

Daley engineers cast the cylindrical concrete columns supporting the various stockpiling conveyors.

equipped primary screen. The coarse product rejected at the screen is surge-piled downhill by conveyor; the sand and water are flumed to a hillside sand-preparation plant.

The sand plant is a dual-purpose set-up processing both specification concrete sand and a so-called "plant sand," a special-purpose blend used principally in asphaltic and soil-cement mixtures. Two Eagle Iron Works water-scalping tanks accept the sand-laden water flumed from the screen, precipitated sand passing through seven valved openings in the bottom of each tank, and the clear water flowing over the tank weirs to a settling pond. Each of the sands is further cleaned, classified, and dewatered in screw washers following the tanks. One of the units is a 44-in. double-screw Eagle, the other is a 48-in. single-helix Wemco machine. Each of the sands is then separately stacked for drainage in a stockpile over a reclaiming tunnel.

Material in the coarse-gravel surge is tunnel-recovered and delivered to the washing-screening, reduction department by conveyor. Processing sequence for the gravel involves, first, a thorough scrubbing in an Eagle log-washer, followed by sizing and spray-washing over a 5- by 14-ft. Overstrom double-deck screen.

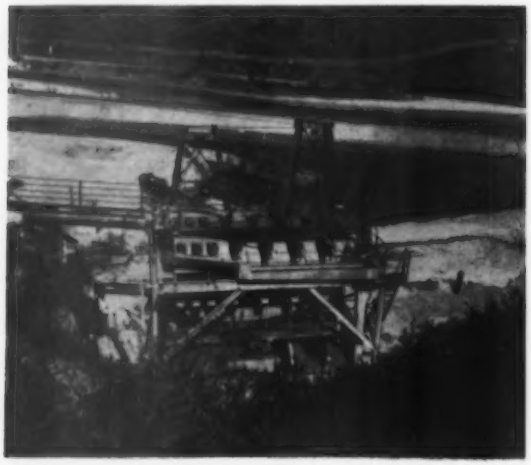
Top-deck rejects are reduced to size by a Symons 4¼-ft. standard cone crusher in open circuit, and the product is carried along to a 4- by 14-ft. Symons horizontally-mounted screen, where the minus ⅜-in. fines are taken out and stockpiled.

Final sizing is done by 5- by 16-ft. Overstrom triple-deck screen with a 4-ft. Symons shorthead cone crusher in closed circuit with the screen.

Besides the two washed sands, finished material is normally in these size ranges: minus 1½ plus ¾ in.; minus 1 plus ⅜ in.; minus ¾ plus ½ in.; minus ½ plus ⅜ in.; minus ⅜ in. Each of the finished products (plus the two types of sand) are stockpiled, the piles being aligned over the 500-ft. tunnel mentioned earlier. The two upper belts carry material to the asphalt plants; the other two supply the bins of the Johnson automatic plant for dry-batching concrete and also the Barber-Greene plant which pug-mills the soil-cement mixtures. Both the Johnson and Barber-Greene plants are served by bulk-cement silos.

Conveyor structures, screens, etc., are supported by cylindrical concrete piles which were cast by company forces using collapsible steel forms and Sonotube paper jackets. In fact, the entire plant was designed and

The sand-preparation plant incorporates two water-scalping tanks and two screw classifiers. The settling pond can be seen in the distance.



The soil-cement mixing plant (left) is near the dry-batching concrete plant (right).

built by Daley engineers, including the various conveyor setups, rock ladders, and other structural components.

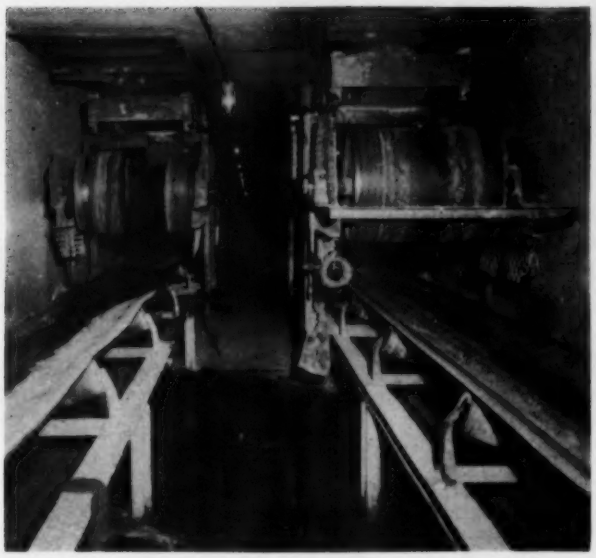
Minus ¼-in. chips and the water from the sizing screens are pumped *via* pipeline to the water scalpers in the sand-preparation plant to augment the sand supply. A 4- by 6-in. American pump makes the lift.

Fresh-water requirements, which are about 3,000 g.p.m., are pumped from 700- and 1200-ft. wells by 50- and 100-hp. Peerless pumps.

Conveyor belting on the main circuits is 24 in. wide for the most part. (The stackers use 20-in. belts.) Two 70-ft. Howe scales allow the largest of the truck-trailers to weigh out in a single pass. The company operates about 150 pieces of on-the-highway equipment in a wide range of types and sizes. Strategic units are equipped with two-way G-E radio, with the transmitter based at the office.

High capacity, as well as versatility in production of asphaltic mixes, is made possible with the company's dual plant setup. These units were erected side by side for direct feed from the aggregate reclaiming tunnel. Both are Model 481 Madsen plants, one of 8,000-lb., the other of 6,000-lb. capacity. Both are pushbutton-operated and feature electric heating of the bitumens; and both utilize dual-purpose gas or oil burners on the rotary driers.

Each plant rescreens aggregates, using Symons horizontally-mounted 2-deck screens; each also dries the aggregates in 8-ft. diameter Madsen counterflow rotary driers. Dust arising in the operations is arrested by 12-ft. cyclones operating in conjunction with Madsen Model 7812 triple wet-tube dust washers.



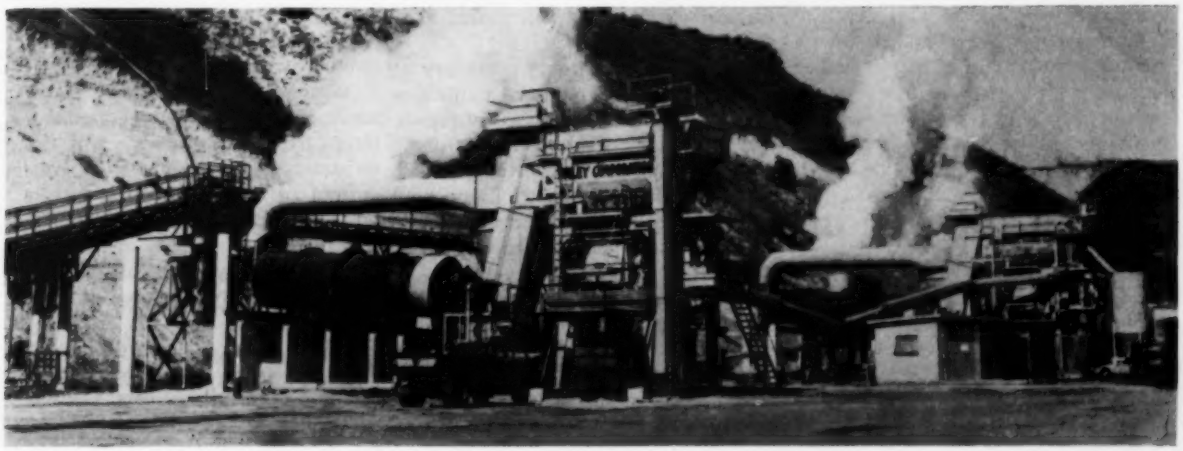
Four separate conveyor belts are housed in the 500-ft. reclaim tunnel at the Daley plant in Murphy Canyon. The two upper conveyors supply the asphalt plants, the two lower belts (in the foreground) serve the soil-cement and concrete-batching plants.

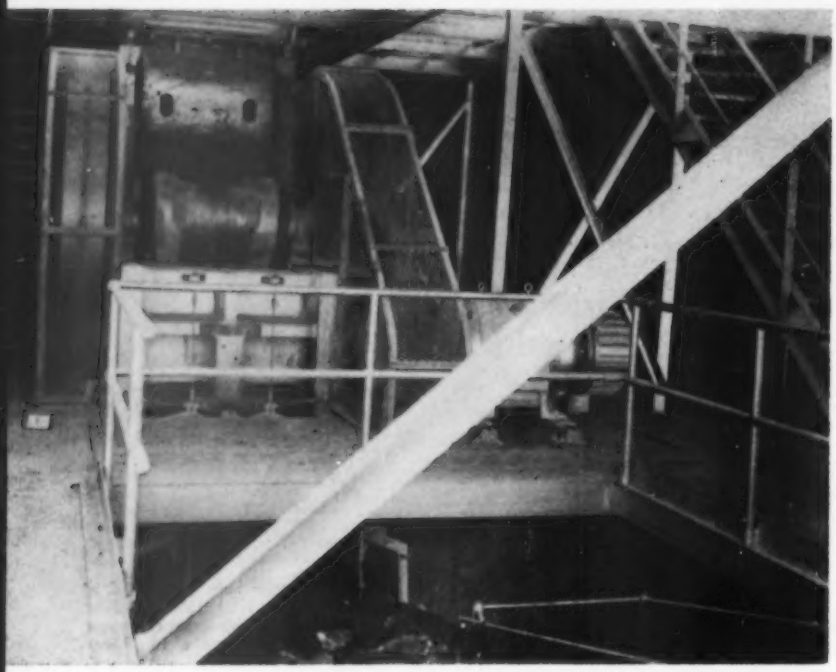
The larger of the hot-mix plants might normally be servicing a single big paving job exclusively on a given day, while the 6,000-lb. plant can be supplying a variety of demands from a number of smaller jobs at different locations in the San Diego area.

Among the other new structures is a modern shop and maintenance building covering about an acre of floor space. Offices were also housed in this building early in 1959, while a fine new office building was under construction. Occupancy of the new offices is scheduled for the immediate future. The new building is about 30,000 sq. ft. in floor area.

Donald L. Daley is president of the Daley Corp. Wallace W. Davis is vice-president and G. B. Gardner is secretary-treasurer. Tom Tulloch is general superintendent; he is assisted by Earl Cheney, plant superintendent, and Dave Rogers, plant engineer.

These two asphalt plants utilize the lion's share of aggregates produced in the new plant in Murphy Canyon. The conveyor at the left carries the aggregates to the 6,000-lb. (left) and 8,000-lb. hot-mix units.





The jaw crusher shown here is driven through V-belts by a wound-rotor motor with enclosed slip rings.

■ What You

By W. G. LEFFERTS
Allis Chalmers Mfg. Co.
Processing Machinery Dept.

Crusher Drives in the Cement Industry

Of the three general types of crushers, practically all have constant-speed drives.

Gyratory Crushers These crushers are low-inertia machines and accelerate very rapidly unless the lubricant is unusually viscous. (In cold climates lube heaters are most often used). Crushing action occurs between the mantle and concaves by a rolling action induced by the gyrations of the shaft free in an eccentric driven by the drive motor.

Although gyratory crushers, when stopped empty, can be started with a normal torque cage motor, they are usually located in a quarry which has a weak power system. The starting inrush to the crusher drive motor may cause the controls of the other motors to drop off the line due to momentary undervoltage. Since this can occur, these crushers are frequently driven by wound-rotor induction motors.

Gyratory crushers are commonly used for first-stage crushing and, when used thus, may be feeder or choke fed. In addition to other factors that dictate the type of motor to be used (*i.e.*, cage or wound rotor), the method of feeding has a decided influence on the type of motor chosen for the drive. When a gyratory crusher is fed by a feeder which is interlocked with the crusher, a power failure or crusher overload causing the crusher drive to stop will also stop the feeder.

In case a NEMA Design "C" cage motor is satisfactory (again disregarding current inrush at starting), normal controls with thermal or time-overcurrent relays can then be used. For the best protection, however, a thermostat embedded in the motor windings should be used with thermal overloads in the starter to sound an alarm.

A choke-fed primary gyratory crusher, however, requires a much more complicated drive for satisfactory operation. The crusher is usually fed from a dump truck, rail car, or shovel through a hopper. Ideally, the crushing chamber will always be full. Should the crusher stop for any reason, every precaution must be taken to prevent the necessity for digging out the material from the crusher.

It would be very convenient to oversize the motor on a choke-fed crusher, so that nothing could prevent its starting. This, however, is uneconomical from both first and operational costs. The best solution is, therefore, to use a wound-rotor motor of sufficient size to get full capacity from the crusher, which, in turn, is sized for its expected output and the maximum size rock with which it is fed.

Presupposing a wound-rotor motor, the associated motor control should contain certain features to give most reliable operation. First, the motor windings must be protected from overtemperatures due to the very erratic loading of the machine and from frequent jogs or reversals. This is best accomplished by thermostats embedded in the motor windings.

Second, the crusher and motor mechanical parts should be protected from undue stress. This can be done by an instantaneous overcurrent or "jam" relay set slightly below the current corresponding to breakdown torque of the motor. Set at about 350 percent of full-load torque, this relay also provides stall protection.

Other control features, which should be incorporated to minimize the necessity for digging out the crusher in the event of unexpected

Part II

Should Know About

modern cement plant drives

stoppage, include high torque jog and reverse ability to make the motor do everything possible to start the crusher.

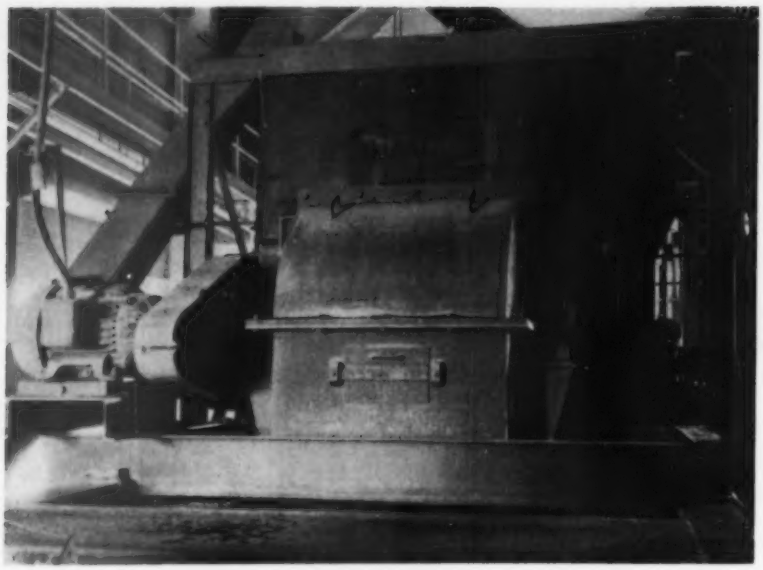
Since all of these features are not easily incorporated in a secondary drum type of control, the magnetic primary and secondary controller is recommended. The enclosure, of course, should be compatible with the surroundings. For cement rock, it is seldom necessary to use totally-enclosed construction. In a dusty place, enclosures for collector rings are available. In a wet place, drip-proof enclosure is nearly always satisfactory.

Jaw Crushers These machines crush material between a moving and a stationary plate and store energy in a heavy flywheel during at least 180 degrees of each revolution. The stored energy from the flywheel supplies most of that required for crushing the material during the remaining 180 degrees of rotation. Since this crusher is difficult to start because of flywheel inertia and drag caused by viscous lubrication in cold weather, wound-rotor motors are frequently employed.

"Jam" relays are occasionally used with jaw crushers to stop the motor in case uncrushable material gets into the feed. The stationary plate is usually spring-held to prevent damage to the crusher in such instances. The motor should stop immediately, however, when currents approaching those of breakdown torques occur.

When operating under heavy loads, jaw crushers transmit current pulses into the power system. While some power systems may allow these pulses, on light power systems

This gyratory crusher is also driven through V-belts by a wound-rotor motor with enclosed slip rings.



Clinker hammermills at the discharge end of air quenching coolers are often connected by V-belt drives to cage motors.

the pulses are apt to cause trouble with other equipment.

Pulsation can be lessened with a wound-rotor motor if a notch-back type of control is used. This control automatically inserts some secondary resistance in the rotor circuit. When the load has lightened, the resistance is automatically cut out, For this reason, the magnetic primary and secondary type of control is preferable to the manual secondary drum and resistor type.

On the heavier power system, the NEMA Design "D" motor is quite suitable and very practical and would constitute the best choice although it is more expensive than either the NEMA Design "B" or "C." On certain installations, however, the cheaper motors may work out satisfactorily for these crushers.

All jaw crusher motors are belted because of the low crusher speeds, so bearings must be suitable for these drives. Motor enclosures should be suitable for the location, but the usual type is drip-proof construction.

Hammermills Hammermills are usually high-speed machines equipped with hammers which crush by impact. The larger, high-duty types are usually directly connected and are classified as high-inertia drives. These machines are rarely choke fed, but are fed from conveyors or feeders which should be interlocked. Such a precaution prevents choking of the hammermill with feed in the event of a power failure.

The wound-rotor motor with high-duty starting resistors is often used with these machines, although many drives are cage motors with high-inertia starting characteristics. When cage motors are used, it is recommended that thermostats be embedded in the coils or core to prevent damage from heat caused by too frequent starts.

Certain makes or types of hammermills should have their controls arranged for periodic reversing in order to distribute the wear on the hammers. A reversing safety switch ahead of the starting contacts is usually sufficient for this purpose. The switch should be safe for personnel to operate.

For direct-coupled motors, either sleeve or anti-friction bearings may be used. When hammermills are V-belt driven, however, the bearings should be anti-friction.

While drip-proof enclosures are usually satisfactory, there are certain small hammermills which are used for reducing clinker size. These are not only V-belted, but are also located where abrasive clinker dust is prevalent in the atmosphere. These motors should be totally enclosed, fan cooled, or the equivalent. No high-inertia problems exist with these small hammermills.

Other Types There are other types of crushers in use, such as double- and single-rolls and combination roll and jaw. The roll crusher is used on comparatively soft material, such as Lehigh Valley limestone. The characteristics of these drives are generally similar to those of jaw crushers.

Fan Drives **Ratings increase for fan drives.** Fans, usually dampered in cement plant installations, have seldom been large enough to warrant the extra expense of an adjustable-speed drive. However, increasingly larger kilns are now being manufactured, so this assumption may not long remain valid. Nearly all of the larger fans are V-belted, and practically all of them are the centrifugal type. For high pressures such as primary air fans of 1 p.s.i.g. or less, the fans have light, high-speed rotors which usually handle the smaller quantities of air at low temperatures. Normally sized NEMA Design "B" motors are adequate for this application.

Fans of larger capacity are classified in high-temperature and low-temperature categories:

High-temperature fans are usually physically large due to the low density of the air or gases to be handled. They should always be started with their dampers closed. The motor ammeters for these fans must be observed while opening these dampers to prevent overloading of the motors. NEMA Design "B" torque characteristics are entirely satisfactory for these fan motors. However, an analysis of the inertia characteristics of the fans must be made to be sure the motors have sufficient capacity to accelerate the fans to full speed.

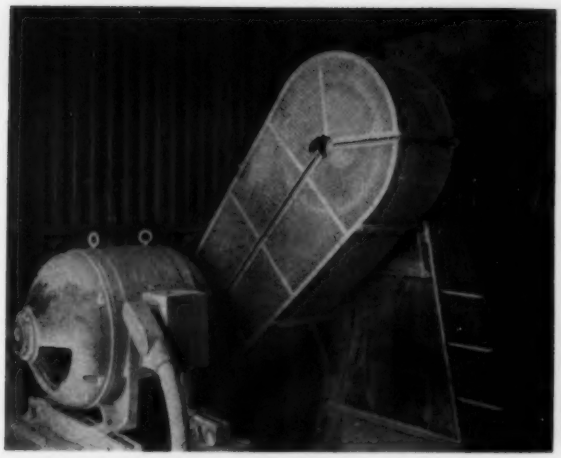
In addition, it is wise to install thermostats in the motor windings to protect them against overheating from too-frequent starts.

High-temperature fans usually discharge at low static pressures and, as a result, do not operate at high speeds. One exception to this is the feed preheater system, which draws the gases discharged from the kiln

through the material being fed to the kiln. These fans are real problems from the inertia standpoint. They are not only large, but also operate at high speeds. Although application troubles have been experienced with motors as small as 60 hp., these are few and far between. But drives of 150 hp. or more should be carefully analyzed to get maximum reliability.

Fans handling atmospheric air in medium volumes at low static pressures should also be checked for inertia to be sure that the motors can safely start them. In general, however, the usual NEMA Design "B" motors of sufficient horsepower rating to drive these fans with wide-open dampers will have enough capacity to start them.

Here, again, thermostats are recommended in the windings to prevent damage from too-frequent starts.



Cage motors are also used for induced-draft fans for temperatures as high as 400-600 deg. F.

Conveyors **The belt conveyor** is easily started, so starting torques of 100 to 150 percent are adequate. However, long inclined belt conveyors must have brake motors or back-stops on them to prevent backward coasting when they are stopped with loads.

It frequently happens in long, high-powered types of inclined belt conveyors that torque during acceleration should be limited to prevent damage to the belt. These conveyors must be accelerated smoothly, and this can readily be done with wound-rotor motors and the proper controls. A torque-limiter can be built into the secondary controls of these wound-rotor motors.

A modification of this class of conveyors is the drag or apron conveyor used in handling hot material. These conveyors require high breakaway torques and are usually short. No acceleration problems occur in the application of this type of drive; and NEMA Design "B" motors are quite adequate, since these conveyors are usually fed at a fixed rate and can be "dug out" if accidentally choked by power failure.

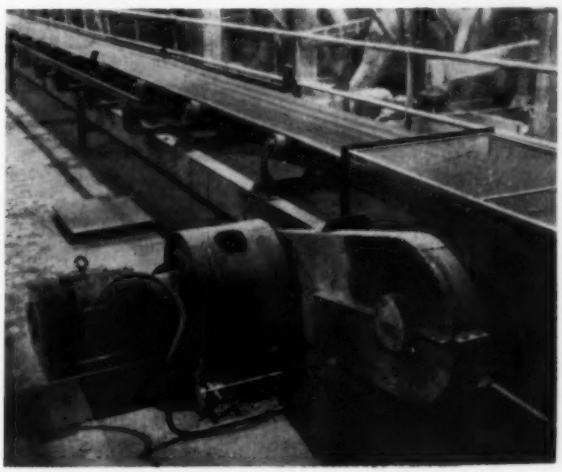
Screw conveyors may be inclined or horizontal, used for fine, dry, and "gummy" materials. Screws have high friction losses and can clog.

It is usual to provide NEMA Design "C" motors on these drives. Once broken loose, the NEMA Design "B" is adequate, and there are many of these conveyors in operation with NEMA Design "B" motors which have functioned satisfactorily for years.

Bucket elevators should also have NEMA Design "C" motor drives, not for normal running purposes, but to provide additional breakaway torque, should the lower end of the housing or "boot" become filled with material and have a chance to pack.

With other conveyor types (vibrating or pan conveyors are quite common) no particular problems occur.

In general, it can be stated that all conveyors fall into a low-inertia classification; belt conveyors have the least friction losses. Environment would again dictate the type of enclosure for the motor. The usual one is drip-proof construction.

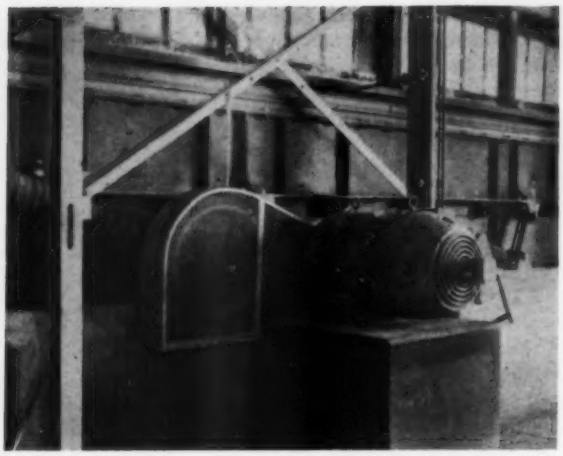


A horizontal belt conveyor with a 5-hp. cage motor drive.

Coolers **Clinker cooler motor needs vary.** The simplest type of heat recuperator for the kiln, the rotary cooler, requires only a NEMA Design "C" (or in some cases "B") motor for its drive. No inertia problem is encountered; and whatever breakaway torque is required is due to lack of oil film in the supporting bearings. This cooler, although simple and trouble-free, is not very efficient; and as a result it has been generally supplanted in newer plants by air-quenching coolers, of which there are two principal types.

One air-quenching cooler has moving interleaved grates onto which the hot clinker falls. The speed with which the hot clinker is conveyed away from the cooler depends upon

A typical horizontal screw conveyor for raw dust uses 5-hp. cage motor.



Air quenching clinker cooler with 20-hp. d.c. motor cools cement clinker and heats secondary combustion air.

the rate at which the grates move. The grate drive must have adjustable-speed characteristics for essentially constant-torque operation, but it must be designed to contain an excess of reserve torque for breakaway and unusually heavy loads. A speed range of 3:1 is sufficient.

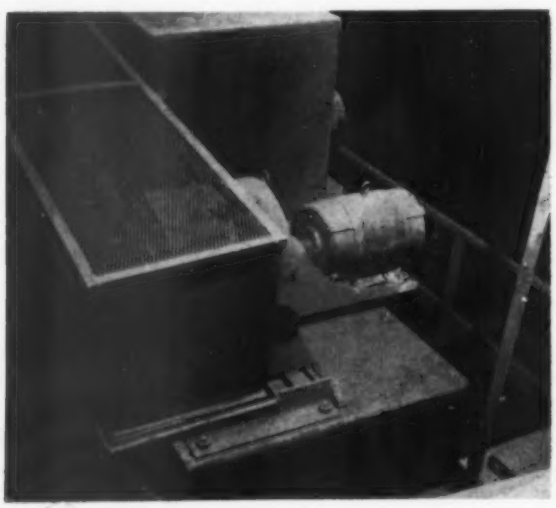
Manufacturers have used almost every type of adjustable-speed drive, both mechanical and electrical, but it is believed that preference is now being given to eddy-current couplings because of ease of automatic control from temperature or pressure sensing. Cool air is blown through the grate interstices around the hot clinker and is heated. The air then becomes secondary air for combustion in the kiln. Motor powers usually range from 5 to 10 hp.

The second type of air-quenching cooler is an easy-starting oscillating machine mounted and driven through springs. The hot clinker from the kiln falls upon the oscillating grate, through which a fan blows cool air. As the cool air passes through the hot clinker on the grate it is heated and becomes secondary combustion air.

Extremely close speed control with variations in load is necessary in this cooler because of the restricted speed range over which this cooler operates. From no conveyance of clinker to maximum conveyance occurs over a speed range of about 250 r.p.m. of the motor, which has a normal operating speed of about 1,400 r.p.m. In operation, a 1 percent rise in speed is desirable from no load to full load to allow for V-belt creep and to assist in stabilizing surges from the kiln.

Preference is shown by manufacturers for an 1,150-r.p.m. base speed motor with field weakening to 1,500 r.p.m., a differentially compounded constant-voltage motor. D.c. voltage which supplies this motor should have maximum stability. Horsepowers range from 5 to 20 for these coolers.

Coolers, in general, should have totally-enclosed motors, as clouds of fine clinker dust occasionally hang heavy in the atmosphere around the motors.



This bucket elevator in cement plant service employs a 7½-hp. drive.

Screens Screens may combine three functions . . . feeding, conveying, and sizing. The principal purpose is sizing, with practically all screens built today of the vibrating type.

Two types of driving mechanisms are in use: motor-driven and electromagnetic. They handle either wet or dry material. Electromagnetically operated screens are usually made in the smaller sizes and capacities, and the larger ones are motor driven. Since eccentric rotating weights impart the vibrating action to the motor-driven screens, the motor must develop sufficient accelarating torques to turn over these weights. Usually the motor does not vibrate with the screen but is V-belted to it.

Actual running power becomes appreciably less than that needed for accelerating. It frequently happens that a NEMA Design "B" motor of

the size required for running will not start the screen. For this reason, it is customary to use NEMA Design "C" motors for these screens. Enclosures must be suitable for the screen location, which may be very dusty.

Slurry and Clay Mixers Most mixers and agitators are slow-speed, rigid paddle-and-arm types and are adequately driven by normal torque, enclosed motors suitable for outdoor use.

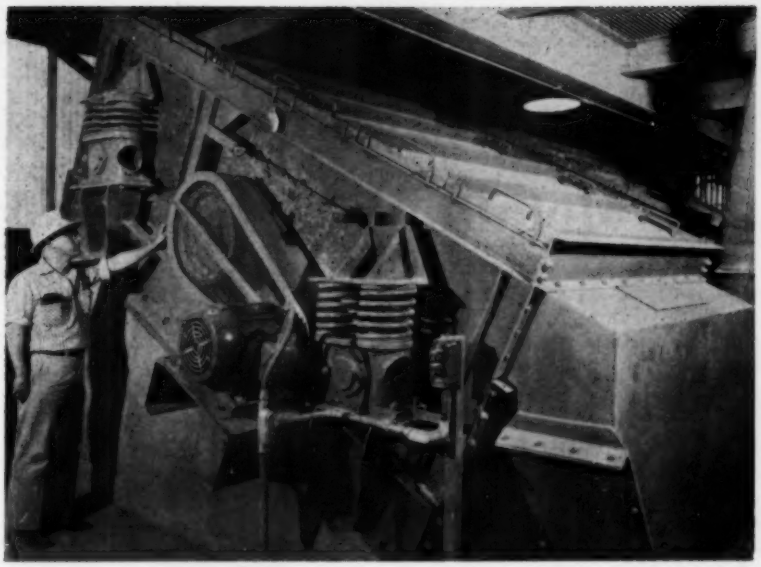
There is one type, however, that should be emphasized because of a peculiarity in its drive. It is a horizontally rotating washmill with chain-suspended rakes on heavy beams rotating in a horizontal plane. These beams swing outward due to centrifugal force when the mixing basin is empty. If the acceleration is too rapid, which occurs with cage motors, the beams strike and eventually damage the basin walls.

Gentle starts are required to prevent this. It is best to use a wound-rotor motor with class 131 or 132 starting resistors or a reduced-voltage cage motor starting on a 50 percent voltage-tapped autotransformer or equivalent reactor. In this case, the starting torque is very light, but the running torque can be quite heavy.

Unit Coal Mill Drives Three classes of unit firing coal mills are in common use: (1) the Ring-and-ball type, the (2) High-side roller type, and the (3) Air-swept ball mill. (This type is properly classified under true ball mill drives, a subject which is entitled to a separate discussion.)

The ring-and-ball type mill crushes the coal between balls and their retaining rings. The mill interior is air-swept by a high-velocity air stream from a separate fan. Two machines are required, each with its individual motor. Starting inertia is low. The coal feeder for the mill is electrically interlocked to prevent flooding with coal; so peak overloads are not likely to occur. Consequently, normal torque motors are adequate for locked-rotor torque. Since cage motors are used with these mills, enclosures are usually drip-proof; horsepowers range from 50 to 200 for each motor.

(*Continued on page* 87)



Enclosed, fan-cooled motor on enclosed screen, which is handling raw feed to the grinding mills in a Midwestern cement plant.

Approximate Torques Required by Various Drives: (% of rated motor torque)

	Starting	Accelerating	Normal Range of Peak Running Torques
Kilns	100-200	50	50-150
Slurry Feeders	50-90	75	50
Screw Feeders	150-200	90	70-100
Vane Feeders	50-200	80	75-90
Table Feeders	50-125	80	70
Slurry Pumps	50-100	85	80
Belt Feeders	40-100	110	50-75
Gyratory Crushers			
With Feeder	25-150	30-155	25-150
Choke Fed	25-250+	30-255+	25-250
Jaw Crushers	75-150	100-175	10-225
Hammermills			
Large	20-150	50-200	25-225
Small	25-150	30-160	20-200
Rolls	25-200	30-200	25-150
Fans			
Damper Closed	25	75	80-100
Damper Open	25	125	80-100
Belt Conveyor	40-100	50-110	50-75
Drag Conveyors	50-150	60-160	75-90
Screw Conveyors	40-200	50-100	40-90
Bucket Elevators	25-200	40-150	30-90
Coolers			
Rotary	75-150	40-110	30-75
Fuller	50-150	55-155	50-75
A-C Air Quenching	10-20	100	25-40
Screens	100	120-200	50-75
Slurry Mixers	100	125	80-90
Wash Mills	25	30-50	75-100
Coal Mills	50-100	60-120	75-100

Canadian Institute of Mining and Metallurgy Meets in Montreal

Industrial Minerals Division features shaft sinking, asbestos, salt mining

THE 61st annual general meeting of the Canadian Institute of Mining and Metallurgy, held in the Queen Elizabeth Hotel in Montreal on April 13, 14, and 15, attracted a record-breaking registered attendance of 2,215.

J. C. Sproule of Calgary, Alberta, succeeded David G. Burchell of Sydney, Nova Scotia, as president. Dr. Sproule is well-known throughout the petroleum industry of Western Canada as a geological consultant.

The many technical papers presented covered a wide range of subjects. Those of particular interest to producers of industrial minerals were presented before the Industrial Minerals Division of the Institute. A brief account of the activities of that Division follows.

At the business meeting of the Division, W. T. Bray was re-elected chairman for another year, and plans were made for future activities.

A feature of the sessions was a panel discussion presented by operators in the industry under the title of *What's Cooking in Industrial Minerals in Quarrying, Mining and Product Preparation*. During the discussions much information was exchanged on many topics, including the use of travel drills, drop balls, new types of explosives, fine-grinding equipment, and nearly every phase of mining and processing of industrial minerals. So much interest was evinced that the discussions had to be spread over two sessions instead of the one originally planned.

J. C. Sproule, newly-elected president of the Canadian Institute of Mining and Metallurgy.

Shaft Sinking

Shaft Sinking and Development at Potash Company of America Limited's Saskatchewan Potash Operation by J. B. Cummings and R. Haworth of Potash Company of America, Carlsbad, N. M., dealt largely with the sinking of a 3,450-ft. shaft through very difficult ground, including water-bearing strata, in order to reach the potash deposits near Saskatoon, Sask. From the outset it was decided to freeze the ground through which the shaft was to be sunk, because the water in some of the water-bearing sandstone formations was under pressure as great as 800 p.s.i.

The freezing was accomplished by drilling 27 vertical holes, spread approximately 4 ft. apart, around the circumference of a circle having a diameter of 36 ft. These holes provided the means of circulating the freezing solution to a depth of 3,000 ft. In addition, a hole was drilled at the center of the shaft and another at approximately 40 ft. from the center to serve as an observation hole. A standard rotary drilling rig was used for the drilling. Close control over the drilling was necessary and readings with directional surveying instruments were taken at 30-ft. intervals to make sure that the hole was not deviating from the vertical. Eleven 2,000-ft. and eighteen 3,000-ft. holes were drilled. This required 681 rig days.

The refrigeration plant, consisting of two Freon-12 centrifugal systems, each with a capacity of 400 tons, was put into operation in August, 1955.

Shaft sinking was commenced in February, 1956, and the shaft was bottomed at a depth of 3,450 ft. in June, 1958. Conventional drilling and blasting were employed, and a mechanical mucker operated from the lower platform of a 4-deck stage to load the blasted material.

Concrete for lining the 16-ft. diameter circular shaft was mixed in a surface plant and dropped down the shaft through a pipe.

Many problems were encountered as the sinking progressed but because of the careful planning, serious stoppages did not occur. The rate of sinking compares favorably with that of other shafts of similar

size sunk under less unusual conditions.

Salt Mining

W. G. Muir, mine manager of Sifto Salt Limited, in his paper, *The Mining Project of Sifto Salt Limited at Goderich, Ontario,* described the methods employed in sinking a circular shaft, 16 ft. in diameter, through water-bearing strata to reach a salt deposit 1,700 ft. beneath the shore of Lake Huron. Investigation indicated that the water pressure was such that the water could be kept under control by advance grouting, and that freezing of the ground would not be necessary. The shaft-sinking contract was awarded to Cementation Company of Canada, which sublet a part of the collar contract to Icanda, Limited, an Italian firm recently established in Canada. The collar is designed to carry the concrete headframe.

Icanda used their method of sinking concrete piles to make a watertight curtain around the collar, which served also as a form to retain the fresh concrete in the collar. Holes 24 in. in diameter were drilled by cable rigs in a circle 24 ft. in diameter concentric with the shaft. A slurry of bentonite and water was used to hold back the soil during drilling operations. Alternate holes were drilled to a depth of 35 ft., after which the bentonite slurry was removed and replaced by concrete.

The piles were so located that when the intermediate holes were drilled, there was an overlap of 2 in. on each of the other piles; and when the concrete was poured in the holes, a watertight joint was obtained between the piles. The soil within the circle of piles was then removed, and the collar and headframe were completed.

Shaft sinking began in January, 1958, and the shaft was bottomed at 1,867 ft. on April 11, 1959. The water was kept under control by advance grouting with cement. Grouting pressure reached as much as 1,500 p.s.i. The ground was such that no explosives were needed until a depth of 100 ft. was reached. Progress in sinking the shaft ranged from 30 ft. of lined shaft per month, under the worst conditions, to 330 ft. under good conditions. In some places, despite the advance grouting, water entered the excavation at a rate of 100 g.p.m. Mucking was done with a 630 Eimco machine which could clean out a 9-ft. round in 6 hours. Rope guides were used instead of rigid guides for the two buckets that hoisted muck.

The room-and-pillar system and trackless mining will be the underground methods used. Rooms will be 60 ft. wide and 45 ft. high, with pillars 210 ft. square. The mine output will be in the neighborhood of 250,000 tons annually. Facilities are being installed to load ships at the rate of 1,000 tons per hour.

Asbestos Industry

Two sessions of the Division were devoted to discussions dealing with the asbestos industry. One of these papers, by M. S. Bradollet and N. W. Edgerton of the Johns Manville Research Center, Manville, N. J., was entitled *Properties of Asbestos Fibers Imported into the United States.* It gave the results of eight years of study of the physical properties of fibers, a project which yielded information not generally known and which is of value in the selection of fibers for electrical products.

C. G. Harris and R. Sluyter of Asbestos Corporation Limited, in a paper entitled *Undercutting at the King Mine,* gave the results of 20 years of experience of Asbestos Corporation in preparing blocks of asbestos-bearing rock for block caving.

Munro Mine Conversion from Open-Pit to Underground Mining, a paper by R. E. Sampson and G. W. Parsons of Canadian Johns-Manville Company, Limited, dealt with the problems encountered in that operation. The property is in northern Ontario, about 50 miles east of Timmins. As the underground mine is directly below the open pit, it was necessary to interrelate the underground development with the open-pit mining so that all ore that could be mined from the open pit was removed by the time underground production was commenced.

It was originally planned to use block caving methods underground; but as development progressed, it was seen that this method would not be desirable, and the mine was laid out to use the blast-hole stoping method. The asbestos occurs in a highly serpentinized section of an ultrabasic sill. The section is 150 to 320 ft. wide and 1,600 ft. long. It dips steeply to the south. The ore haulage level, at a depth of 637 ft., serves the mine. All other levels are connected to a service shaft. Stopes extend across the entire width of the asbestos-bearing zone, and these are mined by blast-hole ring drilling from the drill levels. Present production is at the rate of 800 to 1,200 t.p.d. on a one-shift basis.

Cement and steel are used extensively in the mine because wood cannot be used in an asbestos pit or mine. Concrete is mixed on the surface and sent into the mine through pipes. A diatomite product is mixed with the concrete to make it more smooth flowing and to reduce the amount of water necessary for a workable mix. Aluminum forms are used for all underground concreting.

Details of underground concreting on a large scale were given in a paper entitled, *Use of Concrete in Mining at the Jeffrey Asbestos Mine, Asbestos, Quebec,* by D. P. R. Smyth and W. H. Bonneville of Canadian Johns-Manville Company, Limited. They stated that concrete has been a major means of ground support in all types of mine openings for the last ten years, and that low-cost concrete has replaced other more expensive materials. It has eliminated fire hazards and has made working conditions neater.

Since 1953 a surface central-mix plant has been used to deliver concrete to pneumatic placers, which blow it to underground locations through 6-in. pipes. A breakdown of costs was given including observations on forms, concrete mixes, maintenance of equipment, and

(*Continued on page* 87)

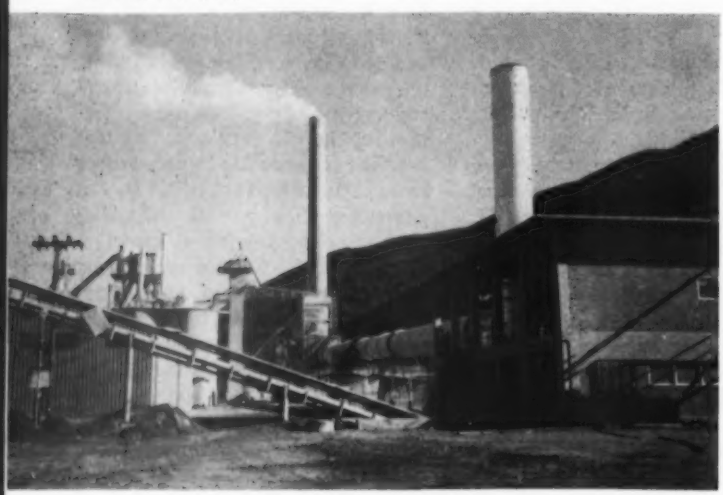
1,200-bbl. one-kiln dry-process operation

BAJA California Gets Its First

By HARRY F. UTLEY

An aerial view of the Cementos California plant at Ensenada, Baja California, Mexico. The 1,200-bbl. per day installation is Lower California's first cement plant.

This view shows the kiln and firing-floor building. In the distance are the blending silos (left).



ANOTHER ON THE SPOT REPORT

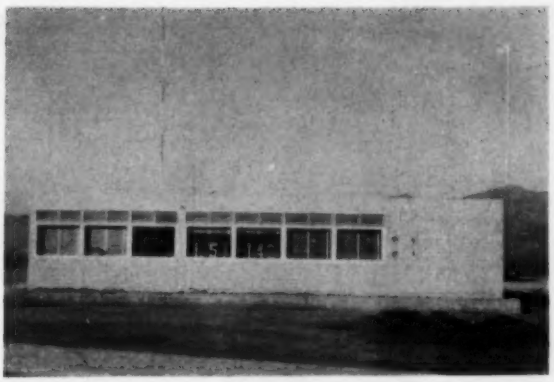
ENSENADA, picturesque Mexican resort and fishing village in Baja (Lower) California, has a new industry — a modern portland cement plant. A sleepy little community only a decade or so ago, Ensenada has tripled in size since World War II and, like the border cities of Tia Juana and Mexicali, it is clamoring for the product to pave its streets and to erect new homes, apartments, and commercial and industrial buildings.

The new plant, owned by Cementos California S. A., was planned and largely equipped by the Kennedy-Van Saun Mfg. & Engineering Corp. of New York City. Production got under way on July 1, 1958, at the one-kiln dry-process operation, with a daily capacity of 225 metric tons (about 1,200 U.S.A. bbl.). This output is sufficient to meet current demand, although the plant is so laid out that expansion could take place at any time without disrupting production.

Every two or three days a barge loaded with limestone goes chugging past rugged Santos Todos Island in the bay where Robert Louis Stevenson wrote his famed "Treasure Island." It is towed into port for unloading at the cement firm's private dock.

The plant was built at Ensenada for economic reasons and because there is an ample supply of native labor. Moreover, a good deposit of

By means of 2-ft. sheet-metal figures in the laboratory windows the kiln operator is informed of volumetric weight and free-lime content of clinker, as per the last sampling analysis.



Cement Plant

clay adjoins the site, to furnish the argillaceous component of the raw mix. The necessary Fe_2O_3 is dug from a hematite pit about 15 miles south and is trucked in.

The limestone quarry was opened and a crushing plant was established at Punta China, 40 kilometers (25 miles) below Ensenada on the Pacific Ocean coastline of the peninsula. Since there is no rail service in any direction from Ensenada, the stone is transported by water. A war-surplus LMS vessel converted into a self-unloader barge is pulled by a tug-boat. This barge carries about 1,000 tons per trip.

A Kennedy Cuber multi-stage impact crusher, closed-circuited with a vibrating screen, reduces the stone from quarry size to minus ⅝-in., ready for raw-grinding at the plant. The sized stone is surge-piled over a tunnel at the Punta China dock and cantilever-conveyor loaded into the holds of the barge. Power is plant-generated.

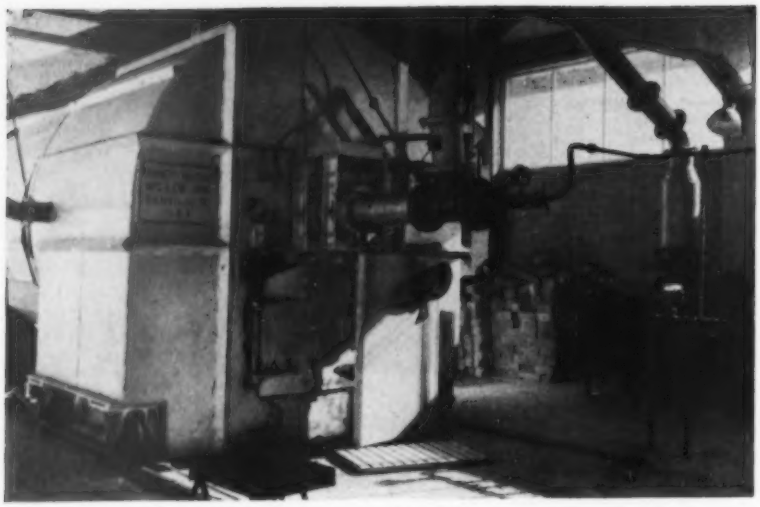
At the Ensenada dock the stone can be stockpiled by the barge conveyor, or it can be loaded directly into GMC trucks which carry 12-ton loads to the cement plant about 2 miles distant. A Bucyrus-Erie B-22 shovel mounted on a White truck can also load from the pile to the trucks.

The raw stockpiles at the plant (limestone, clay, and hematite), the mill building, and the clinker and gypsum stockpiles are in a straight line; and all these materials are tunnel-recovered and conveyed to the raw- and finish-grind ends of the mill building.

The reclaim belt on the raw side delivers to a 3-compartment reinforced-concrete feed bin in the raw mill. Three Schaffer Poidometers weigh and proportion the stone, clay, and iron-bearing components. Initially, only Type I cement is being manufactured although most A.S.T.M. types can be produced on demand.

The raw-grinding unit is a Kennedy 9- by 16-ft. single-compartment air-swept ball mill equipped with an exhauster, cyclones, and radial classifier. Hot air is supplied by an oil-fired furnace. There is also a Norblo orlon-bag collector in the mill circuit. Kennedy pneumatic conveyors deliver to four blending silos and also recover from them. Air for the conveyors is supplied by four Spencer turbo-compressors. Two 81-ft. chain-bucket elevators can recirculate the raw mix before it reaches the kiln-feed hopper, al-

Limestone (foreground), clay, and iron-bearing material are stored over a common reclaiming tunnel and conveyed to the raw mill.



The hood and burner piping on the 270-ft., all-welded kiln.

though one of these elevators is normally in stand-by service only.

A 14-in. by 10-ft. enclosed variable-speed screw conveyor feeds the kiln, the rate of feed being controlled from the burning floor.

The Kennedy all-welded kiln is 270 ft. long, 9 ft. in diameter for 52½ ft. at the feed end, and 8 ft. for the remainder of its length. The enlarged section is fitted with Meehanite-alloy steel vanes to preheat the oncoming mix and recuperate the heat from the gases before they are allowed to exit. The kiln has four riding rings and slopes $\frac{7}{16}$ in. per ft. An Electric Machinery 50-hp. motor drives the kiln through reduction gears; turning speed is in the 55-60 r.p.h. range. Exit gases pass through a dust chamber, Buell cyclone dust collectors, and a 125-hp. fan before they are released to the atmosphere by a 170-ft. stack.

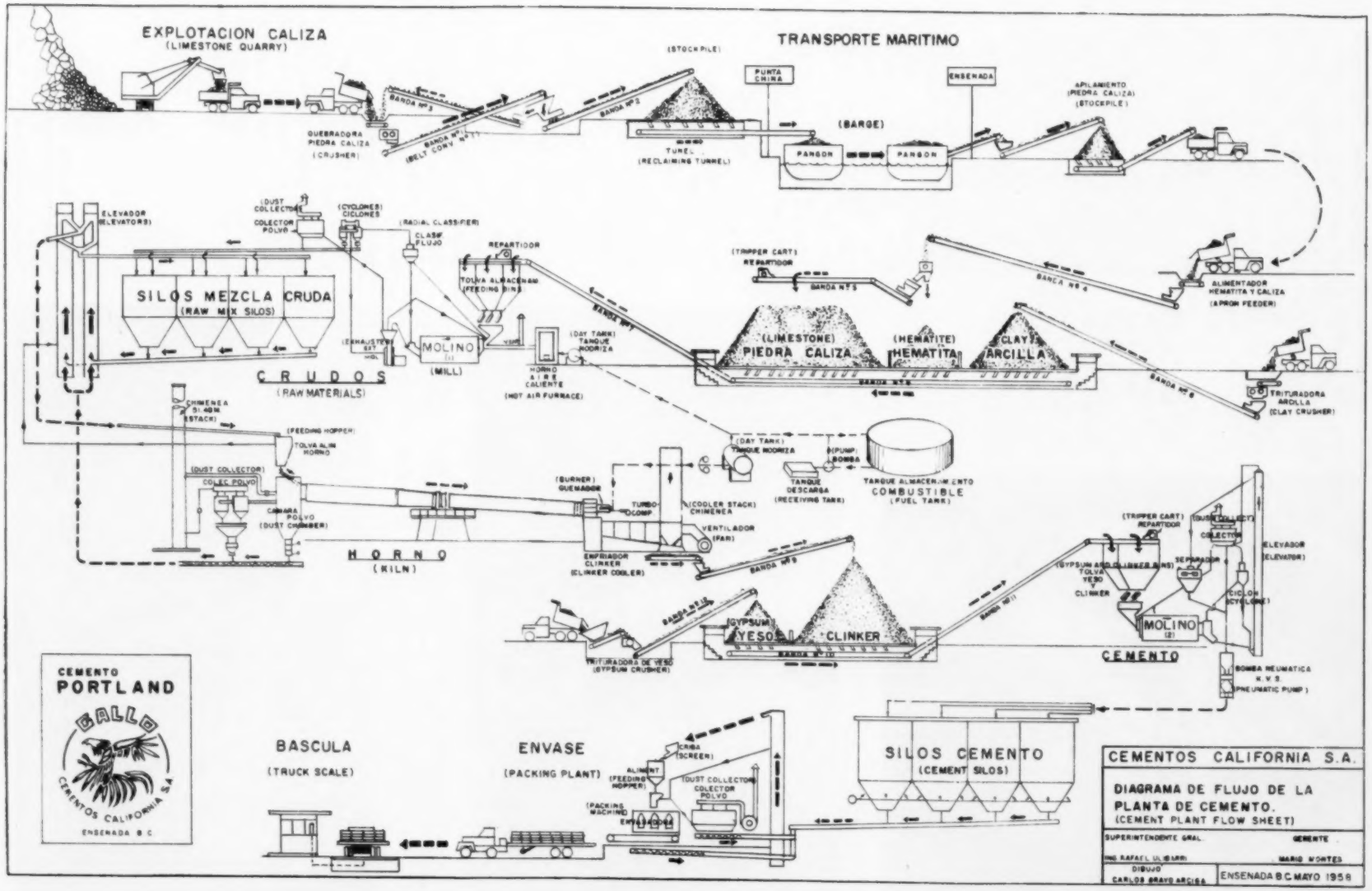
Kiln fuel is Bunker C oil, delivered to the plant by tank truck and stored in a 40,000-gal. tank. A No. 527 Fuller inclined-grate cooler equipped with a breaker handles the clinker after discharge from the kiln. A stack belt then builds up an open-storage pile.

The kiln-control board was designed to give the kiln burner maximum assistance in operating the kiln at peak performance. Instrumentation by Leeds & Northrup provides automatic control of temperature, fuel, air of combustion, and exit-gas analysis. A monitor system records all critical variables. In lieu of telephonic communication with the laboratory building a couple hundred feet distant, an interesting method was devised for informing the kiln operator of any changes in (1) volumetric weight of the clinker, and (2) free lime in the clinker. As the samples are analyzed, results are posted with 2-ft. high figures cut out of sheet metal. These are inserted in two windows of the laboratory building, where they are easily read from the burning floor. (See illus.)

Gypsum is purchased and received at the dock, an occasional load being delivered by vessels of the Kaiser Gypsum Company, which regularly ply between that company's quarry on San Marcos Island in the Gulf of California, and the Kaiser gypsum products plants in California and Washington. It is reduced in size by a 10- by 20-in. Kennedy jaw-crusher before being stockpiled behind the clinker pile.

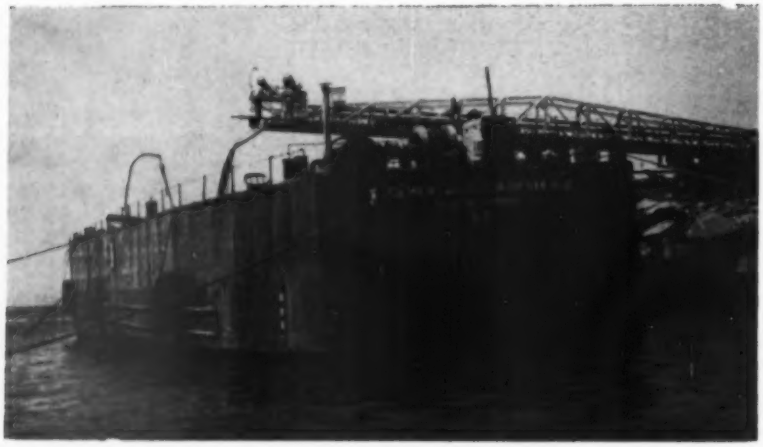
Both clinker and gypsum are carried up to the bins on the finish-grinding side of the mill building by the same belt which operates in the tunnel beneath the piles. Proportioning, as on the raw side, is by Schaffer Poidometers. The finish mill is the same size as that used in raw grinding, except that in this instance it is a 2-compartment unit close-circuited with a Sturtevant 14-ft. air-separator. Dust is recovered in the circuit by an 11,000 c.f.m. Norblo cotton-bag collector. The finish and raw mills, incidentally, are each driven by 600-hp. synchronous motors through Stearns magnetic clutches. The nominal charge per mill is 84,000 lb. of 3-, 2-, and 1¼-in. balls.

The fan and the dust collector installation at the feed end of the kiln. A part of the stack shows at the left; one of the blending silos is at the right.


EXPLOTACION CALIZA
(LIMESTONE QUARRY)
TRANSPORTE MARITIMO
(STOCK PILE)
PUNTA CHINA
ENSENADA
(BARGE)
PARGON
PARGON
APILAMIENTO (PIEDRA CALIZA) (STOCKPILE)
QUEBRADORA PIEDRA CALIZA (CRUSHER)
BANDA No 2
BANDA No 1 (BELT CONV. No 1)
BANDA No 3
TUNEL (RECLAIMING TUNNEL)
ELEVADOR (ELEVATOR)
(DUST COLLECTOR) COLECTOR POLVO
(CYCLONES) CICLONES
(RADIAL CLASSIFIER) CLASIF. FLUJO
REPARTIDOR
TOLVA ALMACENAJE (FEEDING BIN)
SILOS MEZCLA CRUDA
(RAW MIX SILOS)
(EXHAUSTER) EXT. VOL.
MOLINO
(MILL)
(DAY TANK) TANQUE NODRIZA
HORNO ALTA CALIENTE
(HOT AIR FURNACE)
C R U D O S
(RAW MATERIALS)
(TRIPPER CART) REPARTIDOR
BANDA No 5
BANDA No 6
ALIMENTADOR HEMATITA Y CALIZA
(APRON FEEDER)
(LIMESTONE) PIEDRA CALIZA
(HEMATITE) HEMATITA
CLAY ARCILLA
BANDA No 8
TRITURADORA ARCILLA
(CLAY CRUSHER)
CHIMENEA (STACK)
(FEEDING HOPPER)
TOLVA ALIM. HORNO
(DUST COLLECTOR) COLEC. POLVO
CAMARA POLVO (DUST CHAMBER)
(DAY TANK) TANQUE NODRIZA
(PUMP) BOMBA
TANQUE DESCARGA (RECEIVING TANK)
TANQUE ALMACENAMIENTO COMBUSTIBLE (FUEL TANK)
(BURNER) QUEMADOR
TURBO-COMP
(COOLER STACK) CHIMENEA
VENTILADOR (FAN)
H O R N O
(KILN)
ENFRIADOR CLINKER (CLINKER COOLER)
BANDA No 9
BANDA No 10
(GYPSUM) YESO
CLINKER
BANDA No 11
TRITURADORA DE YESO (GYPSUM CRUSHER)
(TRIPPER CART) REPARTIDOR
(DUST COLLECTOR) COLECTOR
ELEVADOR (ELEVATOR)
(GYPSUM AND CLINKER BINS) TOLVA YESO CLINKER
SEPARADOR
CICLON (CYCLONE)
MOLINO (2)
CEMENTO
BOMBA NEUMATICA K.V.S. (PNEUMATIC PUMP)
CEMENTO PORTLAND
GALLO
CEMENTOS CALIFORNIA S.A.
ENSENADA B.C.
BASCULA
(TRUCK SCALE)
ENVASE
(PACKING PLANT)
CRIBA (SCREEN)
ALIMENT (FEEDING HOPPER)
DUST COLLECTOR COLECTOR POLVO
(PACKING MACHINE)
SILOS CEMENTO
(CEMENT SILOS)
CEMENTOS CALIFORNIA S.A.
DIAGRAMA DE FLUJO DE LA PLANTA DE CEMENTO.
(CEMENT PLANT FLOW SHEET)
SUPERINTENDENTE GRAL.
GERENTE
ING. RAFAEL ULIBARRI
MARIO MONTES
DIBUJO
CARLOS BRAVO ARCIGA
ENSENADA B.C. MAYO 1958

Both the raw- and the finish-grinding mills are 9- by 16-ft. units. The raw-grinding mill is shown here, with related piping. It is an air-swept, single-compartment unit.

··This view from the mill building shows the electrical substation (foreground), the clinker-storage pile, the finished-cement silos, and the adjacent packhouse.



This self-unloading barge is being loaded at the Punta China quarry. The vessel, a converted LMS, can carry a 1,000-ton (metric) load of stone.

Finish product goes to four storage silos *via* a 3-in. pipeline, from a Kennedy pneumatic pump. Although the silos are equipped for bulk-loading into trucks, perhaps less than 5 percent of the output is so shipped.

A St. Regis 3-spout packer fills the sacks with 50 kilos (110 lb.) of product, about 17 percent more than is contained in a standard U.S.A. sack. These multi-wall bags are printed and furnished by Ames-Harris-Neville of Glendale, Calif. The product is marketed under the company's "Gallo" brand; and the trademark is a fighting cock. Weights are checked periodically in the packhouse on a Toledo scale. A 50-ton Fairbanks truck scale on the roadway at the plant entrance weighs in the raw material trucks as they arrive. Communication between offices, plant, quarry, and the tug-boat is maintained by the company's own two-way radio system.

All the machinery and steel used in building the plant, except for the kiln, were trucked in from railhead at Tia Juana, 70 miles north at the international border. A good blacktop highway runs from Tia Juana down the coast to Ensenada and beyond. The kiln, rolled and welded in sections at Napa, Calif., was brought down by water, utilizing the barge and tugboat which now transport the limestone from the quarry to the Ensenada wharf.

General offices for the time being are located in a building in downtown Ensenada. Later on an office building is to be erected at the plant. Meanwhile, Ing. Gabriel Vidal Ubeda, *superintendent general,* has his office in one of the rooms in the laboratory building.

The following men head the company: Gen. Jose de J. Clark, president and general director; Jose C. Gallego, vice-president and assistant director; Guillermo Boisson, secretary; Walter Hussong, treasurer; and Ing. Fernando Jara, general manager.

Cement Plant Drives

(*From page 79*)

High-side roller mills crush the coal between the sides of a revolving cup into which the coal is fed and rollers which are held against the inner walls of the cup by springs. The crushed coal is exhausted from the mill by a fan mounted on a shaft extension of the mill drive shaft. The starting inertia is somewhat higher than for the ring-and-ball mill, but still well within the limits of the normal torque cage motor. Horsepowers range from 75 to 300. Characteristics of ring-and-ball mills apply to the high-side roller type.

Experience has shown that these mills may be started several times within a ten-minute period when unstable firing conditions exist. To help prevent damage to the motor, winding, and/or core, thermostats are recommended, although the protection they afford may not be 100 percent effective in all cases.

A.c. Motors in General Squirrel-cage motors are not really suitable for frequent starts, jogs, or reversals; and the use of embedded thermostats in the stators may not, in all cases, assure protection against rotor overheating. Heat transfer from rotor to stator being a function of temperature difference and time, extremely rapid temperature rises in the rotor may not be felt by a thermostat in the stator in time to prevent damage to the rotor. Judging from our experience, however, adequate protection is assured in 90 percent of the cases.

If cage motors are used on hammermills or crushers which may become clogged, jogging in forward or reverse should not be permitted. To be 100 percent effective in protecting rotors during these operations, thermostats would have to be embedded in the rotor. Although this is possible, it is doubtful that cost and maintenance requirements of such devices would be acceptable.

Proper motor sizing is important. Oversized motors driving any equipment discussed will eliminate the necessity for differentiating between normal torque and high-starting torque motors, provided that the feeder wiring is large enough to make voltage drop of no consequence. However, motors should normally be sized to deliver at least 90 percent of their power at peak production.

In the trend to economize on spares, many plants have standardized on high-torque, totally-enclosed, fan-cooled or non-ventilated motors for all ratings at about 50 hp. or less. But during the last year the development of motors utilizing new silicone-rubber and epoxy-resin insulations have made it possible to standardize on open, drip-proof motors with their higher service factors and much lower costs. These motors may be applied almost anywhere in the cement plant.

Canadian Institute

(*From page 81*)

slusher drift cost per ton of ore slushed. Special uses for concrete were outlined and it was proven that the pneumatic placer used in conjunction with a proper batching method can deliver concrete economically from the surface to any underground location.

Development and Production at Lake Asbestos of Quebec Limited, authored by M. J. Messel and L. C. Piuze, told the story of the development of a great asbestos mine from an orebody that lay beneath a lake. At a cost of $36,000,000, a 450-acre lake has been removed, an open-pit mine has been developed, and a mill that will produce 100,000 tons of asbestos fiber per year has been built. Four years were required to complete the project. Production of asbestos fiber began in July, 1958. The open-pit mine, when in full operation, will yield 5,000 tons of ore per day. The mill will add approximately 10 percent to Canadian output of asbestos fiber.

Blasting

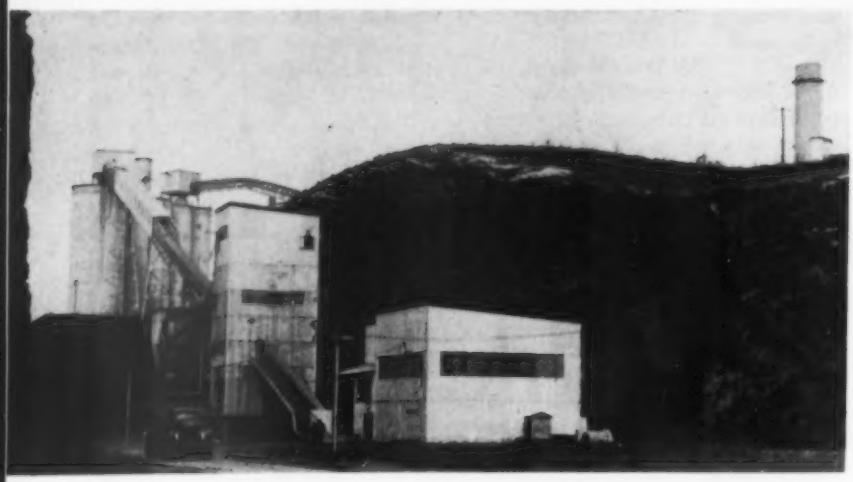
H. E. Farnam Jr., in a paper entitled *Blasting Slurries,* said that Iron Ore Company of Canada has been using slurried explosives in blasting for the last year. More than 500,000 lb. of ammonium nitrate, TNT, and water mixture has been used in that time. It has been found very effective in either wet or dry holes. The cost of the slurry is somewhat higher than that of ammonium nitrate and fuel oil mixture, but savings in drilling costs more than compensates for the additional expense.

Limestone Flux

Production of limestone flux from rather steeply dipping strata at Aguathuna, Newfoundland, was described by J. N. Gillis of Dominion Steel and Coal Corporation in his paper, *Quarry Operations of Dominion Limestone Division.* More than 10 million tons of metallurgical limestone have been quarried and shipped from this property in the last 45 years. A drilling rig of local design for secondary blasting was described. This setup consisted of a 10-ton diesel-driven truck with a steel platform welded over the bumper. On the platform are mounted two hydro-jibs. A 500-c.f.m. compressor is bolted to the truck body, and a hydraulic pump and water tank are mounted on the front platform between the jibs. The latter are equipped with automatic feeds for 6-, 12-, and 18-ft. steel changes, and each has a swing range and a raising and lowering range of 100 degrees. Steel is ⅞-in. hexagonal with a 1½-in. push-on bit. This mobile drill, operated by two men, has proved very satisfactory, being both economical and flexible in performance.

Sulphur Production

Sulphur Production from Canadian Sour Gas, by H. W. Manley of Jefferson Lake Petrochemicals of Canada Limited, presented a great deal of technical information on this new Canadian industry and on its potentialities. The capital and production costs of recovering sulphur from sour gas compare favorably with those experienced in recovering sulphur by the Frasch method now in use in the United States and Mexico, he stated. Presently known Canadian reserves of sour natural gas in Canada could yield 82,000,000 long tons of sulphur during the next 30 years, and it is obvious that several times the presently known gas reserves will be discovered as drilling activity is stepped up. The author concluded that Canada is destined to become a major world source of sulphur.



Whitehall Cement Company was one of the first to have its crushing and screening department in the quarry. The transfer house can be seen between the impactor house and the raw material storage silos.

Whitehall Cement Implements

THE management of the Whitehall Cement Company feels that public relations is an important management function. As such, they follow the adage, known so well to public relations men—"You can't look good till you do good." This is particularly true when a manufacturer is located in a small community such as Cementon.

One major problem was the creation of dust from the rock-crushing operation. The handling system has a capacity of 500 t.p.h. but it is normally operated at 70 percent capacity. Maximum rock size entering the primary crusher is limited by the 2-cu. yd. bucket on the loading shovel in the quarry. The primary crusher sizes the rock to 8 in. maximum and the impactor further reduces it to less than ⅛ in.

Dust rises into the atmosphere whenever small dry particles are subjected to an air current—either by movement of the air or movement of the particles themselves. At Whitehall's operation, these conditions exist at the following points—the truck dump; the entrance and exit of the primary crusher; the entrance and exit of the impactor; and the transfer points for the various conveyors.

In an effort to clear up the problem, Whitehall reviewed a proposal from The Johnson-March Corporation, Philadelphia, Pa., dust control engineers.

This proposal recommended the application of a specially formulated surface active compound, known as Compound MR, to the limestone at the major points of dust generation. This liquid dust control installation is designed to allay the dust particles before they have a chance to rise into the atmosphere. In addition to alleviating the dust problem, the sprayed solution adds a slight lubricity to the rock and makes it easier to handle.

Only a slight amount of moisture is added to the rock, as less than 1 percent is usually enough to take care of all the dust, although the system is designed to add as much as 3 percent moisture. On damp days, when the rock from the quarry contains sufficient moisture, no spray is necessary in the primary crusher house, and the system can be turned off by pushbutton controls. The operator activates more

The operator controls the first application of solution as 20 tons of rock are dumped into the primary crusher hopper. The spray for this intermittent operation is actuated by the operator, who uses a foot switch.

solution sprays used to hold down dust from rock crushing, pulverizing departments

Good Community Relations

sprays as the truckloads of limestone arrive progressively dryer.

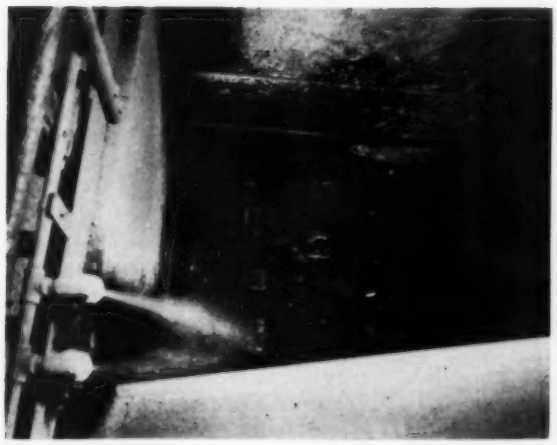
Control of dust with such small amounts of moisture is accomplished by spraying with a chemical solution, rather than water. Untreated water forms globules and rolls off the surface of the rock, leaving a dry surface exposed to the atmosphere. By carefully proportioning one part of Compound MR to 750 parts of water, the resultant solution has many times the wettability of untreated water. The sprayed solution spreads upon application, penetrating deeply and diffusing widely over the surface of the limestone, exposing only damp surfaces to the atmosphere.

Mixing of the compound is accomplished in a small pump house next to the primary crusher. Water, drawn from a deep well, is fed to the system through a constant-pressure device set for 40 p.s.i. The water flow is held constant, and a special 1¼ in. type RM liquid flow proportioner, equipped with a Chem-Jector proportioning pump, provides the flow of Compound MR solution into the system at the desired rate.

The Chem-Jector is a positive displacement pump utilizing spring bellows. It will meter liquids at desired volumes with an accuracy of 1 percent. Pumping action is achieved by flexing the bellows with a cam on the output shaft of the drive motor.

Three applications of Compound MR solution are made in the primary crusher house. Quarried rock is hauled from the rock face in 20-ton sidedump trucks. As these trucks empty their load into the primary crusher hopper, the first application of compound is made by means of 12 nozzles around the hopper. A second application is made by six nozzles at the apron feeder discharge to the roll primary crusher. The final application is made by eight nozzles at the discharging of the primary crusher to cover the new surfaces exposed by the crushing.

Since the truck dumping is intermittent, the operator controls the hopper and apron feeder sprays by a foot switch and pushbuttons. All other spray jets, including primary crusher discharge, are automatically actuated whenever the conveyors



Looking down into the primary crusher. Additional application of the compound from the dust control system keeps the atmosphere above the crusher clean and clear. On dry days, if the spray is not used, it is impossible to see the bottom.

Left: One part of compound to every 750 parts of water is metered by the proportioning pump. .This device, using a spring bellows, is a positive displacement pump that delivers the required amount of concentrate to an accuracy within 1 percent.

Below: A special control actuates spray headers at the impactor and in the transfer house. When the conveyors are carrying material, the load is sensed by the control which turns on the sprays. If no rock is on the conveyors, the spray headers are automatically shut off.

are loaded, although the complete system can be turned off when the limestone is exceptionally damp and little dust therefore results from the crushing operations.

From the primary crusher, the stone is conveyed to a secondary crusher, a Pennsylvania Impactor, which reduces the 8-in. chunks to ⅞ in. Here, application of the compound is made by four nozzles at the discharge of the feed conveyor from the primary crusher, four nozzles at the mouth and discharge of the impactor, six nozzles at the conveyor junction in the transfer house, and six nozzles at the transfer of the reclaim feeder. Before this dust control system was installed, the atmosphere in the Impactor house made handlers' job irksome, to say the least.

Several questions naturally arise: "Can the system be used in cold weather?" Whitehall's system is fully winterized and can be used satisfactorily to a recommended low of 25 deg. F. It can be used on those days from late fall to early spring when the daytime temperature ranges around freezing. There is no danger of equipment damage due to much colder night temperatures.

A 7.5-kw. immersion heater warms the water tank, and a 3-kw. immersion heater warms the concentrate tank. The proportioner tank is insulated, and the warmed solution can be re-cycled to maintain adequate temperatures. The flow controls at the points of application are housed in insulated enclosures which permit internal temperatures to be thermostatically controlled.

"What does all this cost?" The cost of applying Compound MR is approximately ½ cent per ton of processed material. Since Whitehall uses the system only when the limestone is dry, the cost based on output tonnage is even less.

"What does Whitehall get out of it?" Their management lists three benefits derived from the operation: (1) improved working conditions for the employees—especially in dry weather and the hot, rainless summer months; (2) good community relations; and (3) reduced equipment maintenance.

'58 Cement Output, Exports Show Sharp Increase in Italy

Cement exports from Italy in 1958 were more than double the total of the preceding year, with a marked shift in markets. Venezuela became the largest foreign purchaser, rather than nearby countries as in the past. Industry figures show that 53,869 tons were exported in the first nine months of 1958.

Total production has more than doubled since 1951. The top six in world production are the United States, the Soviet Union, Japan, West Germany, France, and the United Kingdom. Italy ranks seventh. The annual production capacity of Italian plants was estimated at more than 14,000,000 tons for early 1958. With the addition of six new plants, the potential was increased by 1,600,000 tons.

ROBERT M. LYNCH, secretary and treasurer of the Standard Slag Company, Youngstown, Ohio, has been elected to the board of directors.

Lightweight Aggregate Processed From Power Plant Boiler Slag

Molten slag from wet-bottom, slag tap boilers can be converted from a waste material to a marketable product—lightweight aggregate—by means of a new process developed by Dow Chemical Co.

Dow already has the process in operation at the South Power House in its Midland, Mich., plant, and has marketed the aggregate locally for use in the manufacture of lightweight concrete blocks.

The company plans to license the process to utilities or other firms with suitable slag tap boiler installations. Adaptibility of the process in an existing installation depends primarily on space available. The potential local market for lightweight aggregate is a major factor in determining economic feasibility.

Equipment involved in the new Dow process includes a slag conversion unit and necessary conveyors, a crusher, a screen, and storage and handling facilities. Based on the current average selling price for slag aggregate, it is estimated that the average utility could expect a return on capital investment in five years, or even a shorter period.

Aggregate produced by the process at Midland, Mich., has been trade-marked Dowlite. It is an iron aluminum silicate that exhibits both light weight and strength characteristics as well as good free-flow qualities in block machines.

It has the appearance of black glass when cold and is designated as amorphous. The aggregate is inert and contains no unburned combustible material. Its inert characteristics are said to prevent "popouts" which can occur in blocks when unburned material is present.

The raw slag is melted boiler ash resulting from the combustion of coal, which is put thrrough an expansion process. Subsequent crushing and screening provide aggregates in two sizes—coarse, which will pass a No. 2 mesh and be retained on a No. 4 mesh; and fine, which will pass a No. 4 mesh. Both conform to A.S.T.M. specifications C-331-53T.

Crushed Dowlite is angular in shape, with a minimum of flat or elongated particles. Cellular structure is uniform throughout and is evident even in particles which pass a 100 mesh screen.

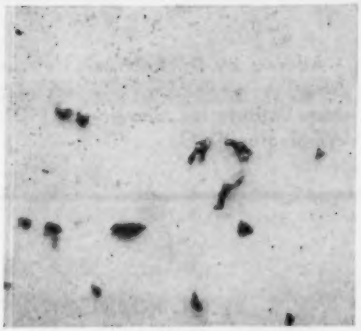
The use of molten boiler slag for expanded lightweight aggregate is a new development, although expanded slag has been made from blast-furnace slag and sintered cinder clinker ash. The lightweight aggregate produced by the Dow process is suitable for use in concrete masonry units, preformed concrete building wall and roof sections, and lightweight concrete.

An 8- by 8- by 16-in. concrete block made from Dowlite (using a mix of one part of cement, two parts of coarse aggregate and three parts fine) weighs from 26 to 30 lb. and has a 28-day compressive strength of about 1300 p.s.i. This meets Class A block specifications.

The lightweight aggregate block produced has a soft gray color, and has displayed good color stability.

Blocks made from Dowlite have been specified in Dow plants when structural lightweight masonry units are required. Architects using such blocks can specify texture, from fine to coarse, depending upon the ratio of aggregate sizes.

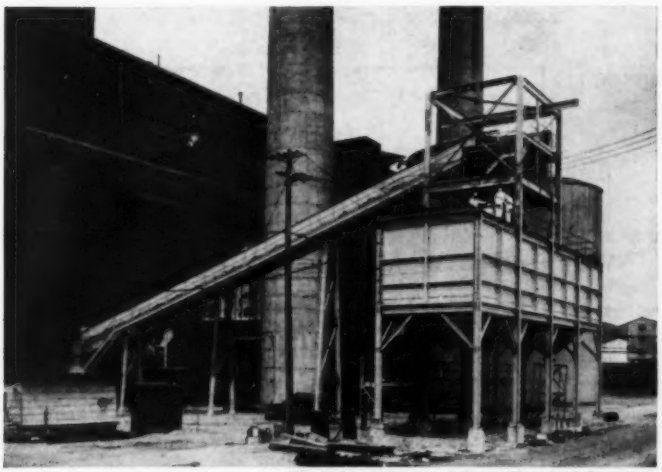
Dow has a continuing testing program in progress to explore all possible uses for the new expanded-slag in construction materials.



—Photo by courtesy of Dow Chemical Company

The cellular structure of Dowlite is shown in these micro-photographs of crushed material in the minus 100-mesh range. The upper photo is a 20X and the lower a 75X magnification.

—Photo by courtesy of Dow Chemical Company



—Photo by courtesy of Dow Chemical Company

Dow's expanded-slag installation at the firm's Midland, Mich., operation. A crusher and a single-deck vibrating screen are located above the four storage and loading bins.

Address by Dr. Robinson Newcomb presented at the annual convention luncheon of the National Crushed Limestone Institute, Inc., January 22, 1959, Hotel Statler-Hilton, Washington, D. C.

BIG——But

By DR. ROBINSON NEWCOMB

Economic Consultant, Government Economist

THE one thing about which I am fairly certain is that our highway program has to be bigger. In constant dollars, if there were such a thing, the economy has grown from 3 to 3½ percent year in and year out including the depression years—including the 30's. I believe—and most technicians in the field believe—that the economy in the future can grow at least this fast and very possibly slightly faster.

The economic report to the President issued . . . goes into some detail in explaining why and how we've been able to reduce the likelihood of serious recessions in the future. So, if the economy has grown this fast with serious recessions, it certainly should grow this fast without them and, very likely, faster without them.

Traffic has to grow faster than business as a whole. If business as a whole grows 3½ percent per year, traffic has to grow faster—at least 4 or 5 percent per year. Advancing culture and the increasing complexity of civilization require a greater and greater interchange of materials and of services.

The self-sufficient peasant may make cloth for his own needs, and provide most of the materials and labor for his own food and shelter. He may depend on others for very little more than salt and the simplest of tools. He needs little in the way of roads or other transportation.

But with the onset of specialization, one of the essentials of increasing productivity and rising standards, must come more transportation. A man who weaves more cloth than he uses tries to exchange it for food and other things that he needs. Roads or other means of transportation must be developed if he is to exchange his cloth for what he considers the necessities of life. Otherwise, he must go back to a pastoral or a hunting economy.

Specialization means exchange — exchange means traffic—and the type of mass traffic which has been growing most rapidly is highway traffic. And that highway traffic requires facilities in the form of better highways.

Highway traffic for all except basic commodities, such as coal, steel, timber, and grain, is providing the most efficient transport when all things, including time, are considered. So, if traffic as a whole grows faster than the economy, highway traffic particularly grows faster than the economy. Vehicles traveled twice as many miles over highways for each given value of business done in 1929 as they traveled for the same volume of business transactions in 1922.

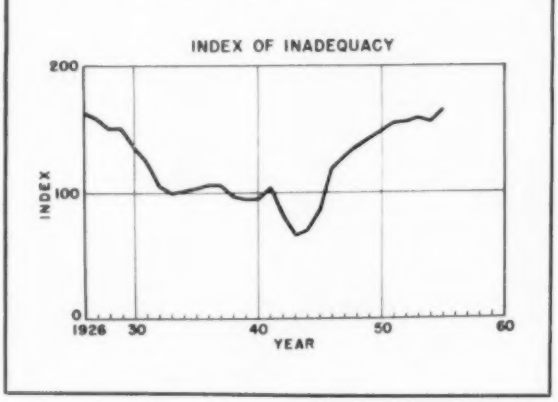
Or to put it differently, there were twice as many vehicle-miles per dollar of buiness done in 1929 as there were for the same volume of business done in 1922. This is all, of course, in constant dollars.

The growth in business about which I have been talking, . . . represents an increase in real, not inflated, dollars. The highways, no matter how you look at it, have to be improved. Growth in highway traffic during the 'twenties followed the normal growth pattern of most healthy new industries. Traffic grew 11 percent per year compounded annually, more than did business during the 'twenties. And, traffic grew even during the depression in relation to the volume of business. From the peak of prosperity in 1929 to the depths of depression in 1933 traffic per volume of business done grew at an annual rate compounded at about 10 percent per year. That's almost as much during the recession as it grew in the prosperous years of the 'twenties. Even the depression did not stop the growth in relative highway use.

Here the story begins to get a little complicated, and if it's hard to follow, don't worry because the concept is basically the same one. If the economy continues to grow, then highway traffic should grow somewhat more.

New industries tend to show a standard growth pattern. They tend to grow slowly at the onset, then the rate speeds up, then the rate of growth finally declines. But in any basic industry the rate of growth does not suddenly stop. As a new industry is replaced by an old one, as the railroads were replaced by highways, or canals were replaced by railroads, the rate of growth in

Chart 1



Not Big Enough

these industries slowed down. But it didn't suddenly reverse itself.

The growth of highway traffic did not follow this historic, yet basic economic pattern. The growth of highway traffic did not taper off as normally happens. It stopped abruptly. It shifted from a positive rate of growth of 10 percent per year, even during the depression years to a sharp decline. Such a sharp reversal in trend from a high rate of growth to a negative rate is unusual. In no basic industry can I recollect this having occurred except in highways.

What happened is fairly obvious. Highway construction was fairly well maintained through 1931. Real expenditures on a constant dollar basis rose about 10 percent per year from 1921 to 1931. This, according to the Bureau of Public Roads studies, provided a capital investment in 1931 that was about 4.6 times as great as it was in 1921. As the highway traffic was about 4 times as great in 1931 as it was in 1921, highways were about as well equipped to carry the higher volume of traffic in 1931 as they had been equipped to carry the lower volume of traffic in 1921.

But highway construction almost stopped in 1932. Construction dropped over 10 percent in real terms from 1931 to 1932 and another 30 percent from 1931 to 1933. Highway capacity, as measured by depreciated investment, stopped rising at a rate which would permit highway traffic to grow as it should grow. Roads became congested. Hardening of traffic arteries appeared.

Chart No. 1 was prepared by the Bureau of Public Roads using Public Roads data on investment in highways and on traffic. It is drawn as an index of inadequacy.

If it is turned upside down, it becomes an index of adequacy. (Note Chart No. 2.)

This chart shows that roads became more adequate from 1921 to 1930, that is, we built more capacity in 1921 to 1930 than we added to our traffic. So the roads were better and better able to handle traffic up until about 1932. But from then on adequacy dropped. Of course, the roads were able to handle the traffic during the war years because we held traffic down.

At the end of the war the roads were freed again, and traffic was allowed to grow. The chart shows what happened. Adequacy, on the basis of 1939-40 equals 100, dropped to 61 in 1955. We haven't been building roads fast enough to keep up with traffic. That is why in part it takes you so long to get from your house to your work.

The next chart, No. 3, was also prepared by the Bureau of Public Roads.

It shows annual expenditures on highways per vehicle-mile traveled. This was determined using 1947 and 1949 construction dollars, calculated by the Department of Commerce. What was done was to divide the number of dollars spent each year, in constant terms as calculated by Commerce, by the number of vehicle-miles as estimated by the Bureau of Public Roads.

If we look at the figures for the beginning of the 'twenties we spent almost 1.2 cents for each mile traveled. In 1958 money, that would be about 1.9 cents. We spent this down through 1929 for each mile traveled.

But during the early years of the Hoover regime expenditures on highways were increased. We sometimes forget that public and highway expenditures rose in 1930. They were higher in 1931 and in 1932 than they were in 1929. They continued to rise more than traffic during these years. We fixed up our roads fairly well through 1932, as you may remember from the index of adequacy or of inadequacy which we just saw.

Chart 2

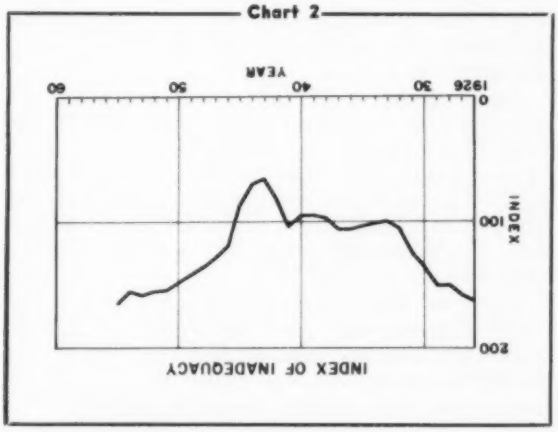
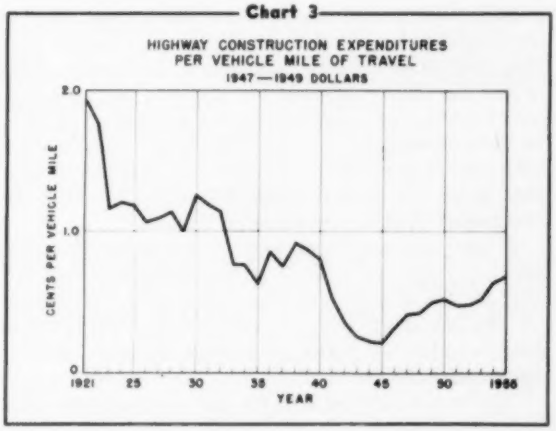


Chart 3



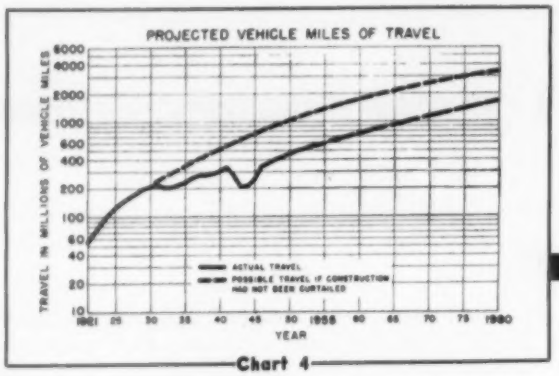


Chart 4

But in 1933 we checked our spending on roads. Outlays went down to something like 0.6 of a cent a mile or thereabouts by 1935. Then appropriations were increased again, and public roads construction was revived. Expenditures rose to about 0.9 of a cent per mile. Then they went down and with the war, to something like 0.2 to 0.3 of a cent.

By 1955 we were back up to something like 0.6 and now they are something less than 0.7 compared to 1.2 cents in constant dollars in the 1920's. *In spite of all we spent last year, we are still spending less per vehicle-mile than we spent even in 1933 and far less than we spent back in 1925-29.*

Today's program seems big. You've been told many times it's a big program. But in relation to the size of the country and in relation to the volume of traffic, it isn't a big program. It's six-tenths as big as it was 20 years ago. We forget how big we are; we forget that this is a growing country, a country growing 0.75 percent per year.

If the country grows this fast, obviously its expenditures for utilities must grow to keep abreast. We don't get excited when the A. T. & T. issues another big bond issue and spends more money for lines or switchboards. We don't get excited when the Potomac Electric Power, or your local utility, spends more money to increase its capacity for generating electricity.

The only time we worry about spending to improve public utilities is when we talk about something like public roads. Payment for this utility comes out of the public exchequer instead of the private pocketbook. You men won't sell your limestone to the road program unless the money is available to build this program, which I hope you won't call a big program, but more or less a normal program. Nothing comes without some effort and it won't take an awful lot of effort on your part to get the appropriations through, I am sure, for this normal highway program.

If our economy is to grow 3½ percent per year, highway traffic will have to grow roughly 5 percent per year for the next decade. The heavy dotted line on top on the last chart, No. 4, indicates what traffic might have been had we continued to build highways and had we avoided the recession.

The heavier dotted line on the right suggests what traffic may be if we continue to build adequate highways now. The rate of growth which may be necessary for our economy to gain 3½ percent to 4 percent a year would yield a traffic volume of about a trillion, two hundred billion miles by 1970.

I'm throwing this in because pretty soon we will have to learn to talk in terms of trillions. By 1970 a high employment volume of business, in 1958 dollars, would be something like $750 million. But by 1985, maybe, it will be something like $1 trillion.

Now most of us hope to be alive in 1980, so we will have to learn to talk in terms of trillions.

We are approaching an era in which, in the highway field, we will have to talk in terms of trillions earlier than we do in the terms of the national economy. But we won't have a national economy of $750 billion by 1970 unless we have highways which will permit traffic growth of one billion vehicle-miles and probably 1.2 billion by 1970.

Those who would suggest that we hold back on highway expenditures are actually then suggesting that we should restrict the rate of growth of the economy. That would mean that we would not need highways to transport goods which the unemployed are not producing. If we permit the economy to grow and the unemployment to remain relatively low, we must provide the capacity to move the goods our higher rate of economy will create.

A calculation of the capacity required for the sort of traffic I have been discussing, suggests that something over $8 billion per year would be needed for construction between now and 1965. About another $4 billion might be needed for maintenance, debt service, police costs, and so on. This $8 billion estimate may be compared with a construction outlay of approximately $5,350,000,000, as estimated by the Department of Commerce for last year.

This estimate would suggest that during the next decade the average should be increased about 50 percent. The estimated outlay for 1959 is about $6 billion, or an increase of over 10 percent. For the decade 1966 to 1975, construction expenditures needed may approach $11 billion. That's double last year's expenditure. This would suggest your sales then may be double what they are now.

Once we have provided adequate highways, the capacity needed may grow but little more than the economy as a whole—approximately 4 percent per year. In the meantime, let's not create unemployment in order to avoid the expense of creating highways.

By C. E. GOLSON
Manager, Sales Development
Aggregate Beneficiation
WEMCO Division, Western Machinery Co.

Modern classification methods *applied to fine aggregates*

Part I

MODERN concrete technology emphasizes the basic qualities required of an acceptable aggregate: it must be clean, sound, homogeneous, and of a size gradation resulting in a concrete of the desired physical qualities at the minimum cost.

In the case of coarse aggregates, crushing, scrubbing, and screening will usually provide the required material, although beneficiation is often necessary in order to eliminate unsound or deleterious fractions.

Beneficiation is also applicable to fine aggregates, but the processes most often employed are washing, classification, and dewatering.

Classification is the sizing of solid particles by differential settling. The undersize is caused to flow away with the wash water; the coarse particles settle and are dewatered as they are recovered. When the stream of liquid flows across the classifying vessel, the process is called *surface current classification;* when the stream flows upwards through the vessel and overflows at the top, the process is called *rising current classification.*

The path of the settling particle in a classifier is the resultant of two forces: that of gravity and that of the stream of slurry carrying it through the classifying vessel. Gravity causes the particle to fall at a rate depending on the resistance offered to this downward movement by the density and viscosity of the slurry. The stream would carry the particle forward through the vessel and over the overflow weir.

In processing aggregates, the slurries are very dilute, and their resistance to the fall of the solid particle is low; therefore the resultant path depends mostly on the velocity of the stream, hence the term commonly used: *velocity classification.*

In hydraulic cyclones the velocity of the stream is increased; and by confining the movement to a circular path inside the classification vessel, very high centrifugal forces act on the particles, and rapid segregation of particles by size is established. The term *accelerated settling* describes the phenomenon.

There are also cases in which the density and viscosity of the slurry can be increased by artificial means, so that the effect of gravity is retarded or impeded. The differential in rate of fall under these conditions is used in *hindered settling.*

Differences Between Classifications Of Ores and Aggregates

Both the fundamental theory of classification and the equipment used are essentially the same for aggregates and for ores, but the nature of the materials to be treated, the products required, the conditions of the problem to be solved, and the methods employed to solve it differ. (See comparison below.)

Mineral Dressing	Aggregate Preparation
1. Value of material seldom less than $3 per ton.	1. Value of material seldom exceeds $1 per ton.
2. Heterogenous material with marked differences of specific gravities of components.	2. Homogeneous materials with small differences in specific gravities of components.
3. Differences in sizes of "equal falling" particles.	3. Differences in actual falling rates due to differences in size only.
4. Classifier feeds usually at low dilutions.	4. High dilutions of classifier feed very common.
5. Separation sizes usually in the finer sizes.	5. Separation sizes in the No. 50 and No. 100 are common, although separation at No. 200 is becoming more frequent.
6. Purpose of classification—to control grinding required to liberate mineral from gangue.	6. Purpose of classification—elimination of unwanted fractions, maintaining size gradation, dewatering.
7. Overflow usually contains desired product.	7. Overflow usually contains undesired product.

Fig. 1—A hydro-separator, application of the settling device to the aggregate industry.

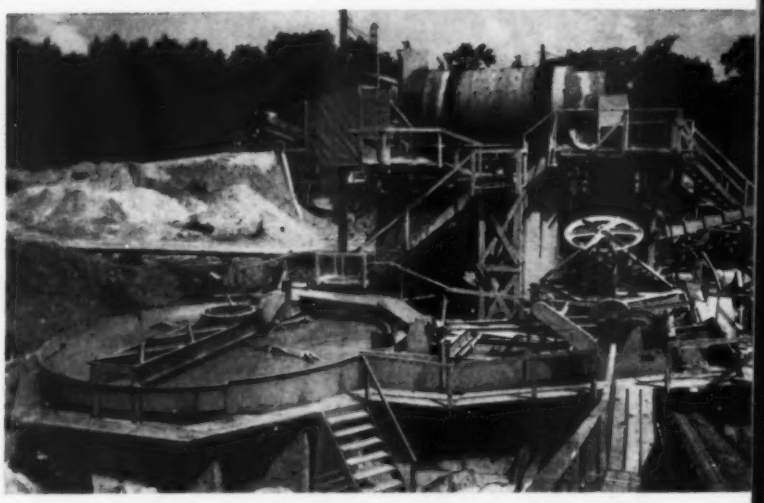


Fig. 3—The bowl Desiltor, a modification of a bowl classifier (25-ft. diameter bowl) combining the hydro-separator and the rake classifier.

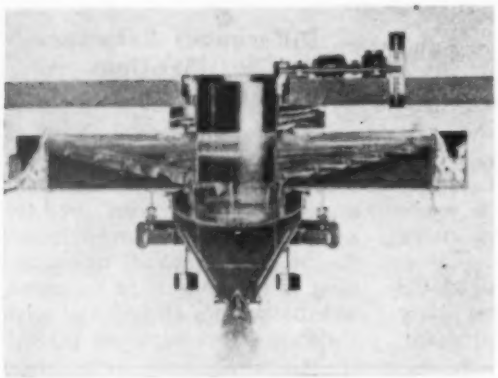


Fig. 2—The Auto Vortex bowl, combining the cone classifier and hydro-separator.

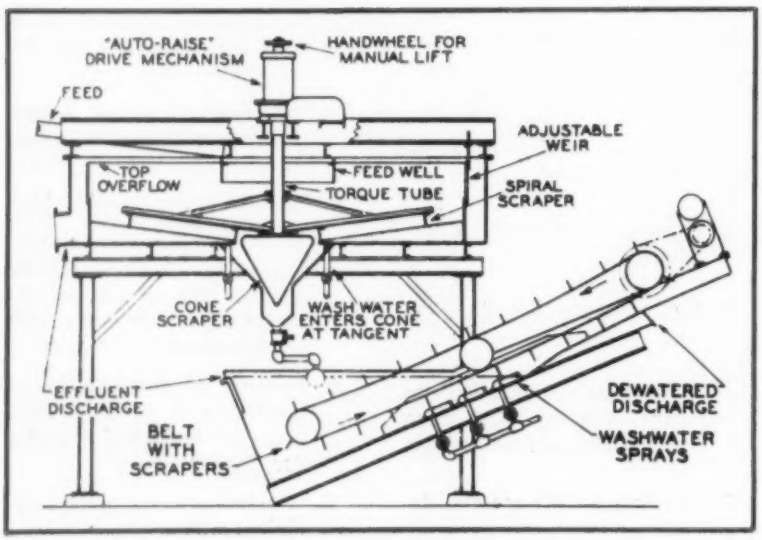


Fig. 4—A hydro-separator combined with a drag belt classifier.

Statement of the Problem

A statement of the problem which classification is called upon to solve in the aggregate industry will serve to establish the factors involved:

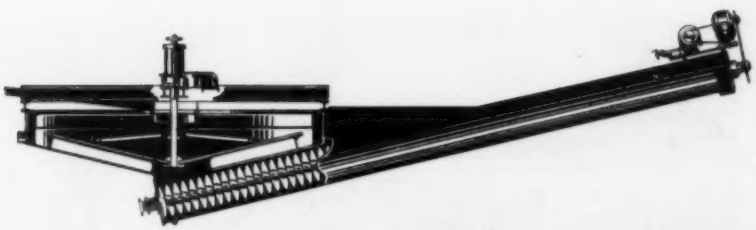
Classification should deliver a product of a given size consist, free of undesired fractions and containing the minimum of entrained water, and it requires the following component operations:

1. Removal of portions of size fractions in excess
2. Prevention of loss of desired size fractions
3. Removal of unsound or deleterious materials
4. Removal of excess water

The process requires two mechanical steps: (a) actual *separation* of the desired solids from the undesired solids and liquid; and (b) *recovery* of the desired solids and their delivery to further processing or handling.

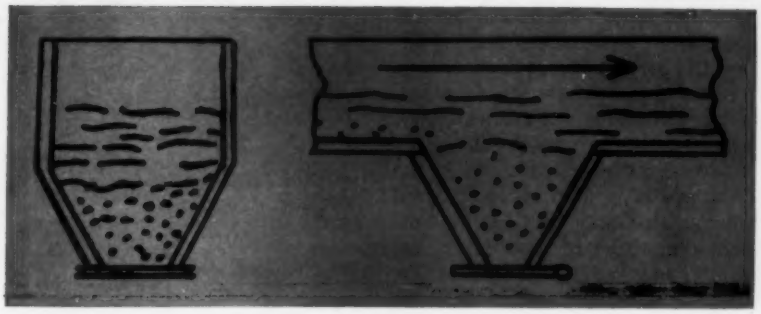
In velocity classifications, the direction of flow of the stream in its relation to the force of gravity results in different particle paths during the settling or separation step, so that the various types of velocity separation could be listed as:

1. Separation from a surface current
2. Separation from a rising current
3. Separation due to a change in direction of surface or rising currents



Left: Fig. 5—A hydro-separator combined with an Archimedean screw conveyor-classifier.

Below: Fig. 6—Sketches of a classifying flume, showing pockets and a hinged gate.



General Types of Recovery

Recovery of the desired settled solids is a mechanical problem which has influenced the design of the devices and machines used. By differentiating between the types of separation and by further subdividing the equipment according to means of recovery, a general classification of this equipment can be made. Although such generalizations are always invidious, this classification will be used as an outline of the discussion of applications and equipment.

Applications and Equipment

A. Velocity classification devices
   1. Recovery by settling only.
      (a) Settling tanks
      (b) Hydro-classifiers
      (c) Combinations with other classifiers
   2. Recovery by bottom unloading
      (a) Classifying flume
      (b) Scalping tank
      (c) Cone classifiers
      (d) Cones - with hydraulic water
   3. Recovery by conveying devices
      (a) Drag-classifiers
      (b) Screw-classifiers
      (c) Rake-classifiers
   4. Recovery by scooping out of a current

B. Accelerated settling devices

C. Hindered settling devices.

A-1 Velocity Classification—Recovery by Settling Only There is little attempt to do more than separate the solids from the liquid by the use of these devices. Most of these devices are used in conjunction with other classification equipment.

(a) The simplest forms are the settling pond, settling tank, or even

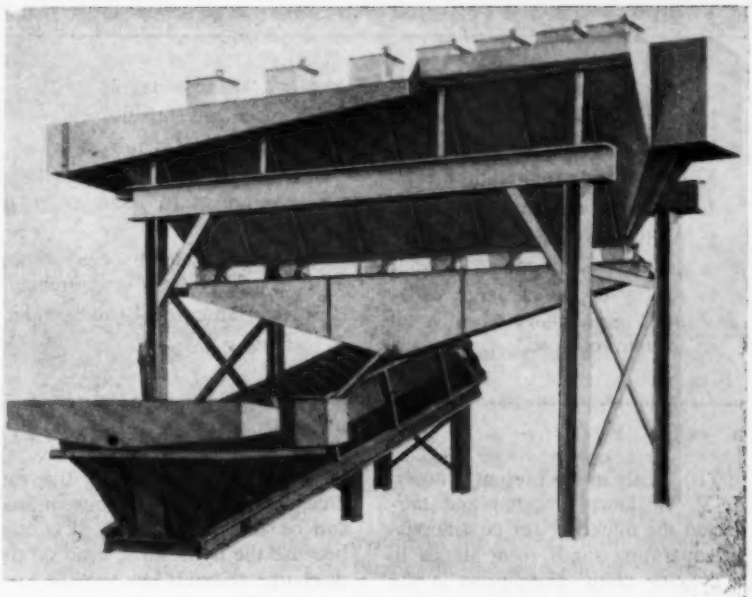


Fig. 7—A modern scalping tank, developed from the classifying flume.

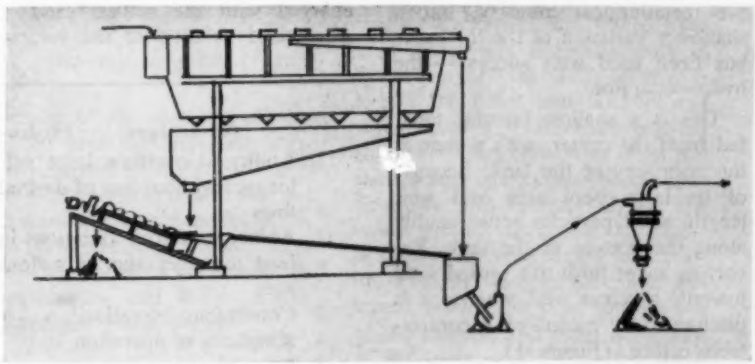


Fig. 8—The scalping tank requires a dewatering classifier and a cyclone to recover fines from the overflow.

the dewatering storage bin. If sufficient area and overflow weir length is provided, a satisfactory solid-liquid separation can be made. Decanting of the overlying liquid must be provided for at low enough velocities to avoid fine desired fractions being entrained in the overflow and wasted, but at a rate sufficient to ensure that the settled material is as free of water as possible. Unless extremely large ponds, which can be divided into sections are provided, multiple installations are necessary, since it is impossible effectively to reclaim the settled sands in the presence of a flow of unseparated slurry. This may lead to intermittent production of sand during the filling and settling phases of the cycle. (Note the comparison following below.)

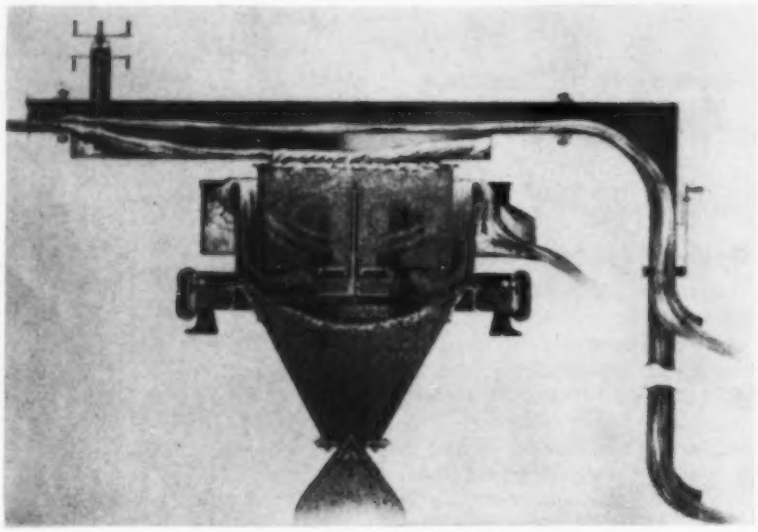
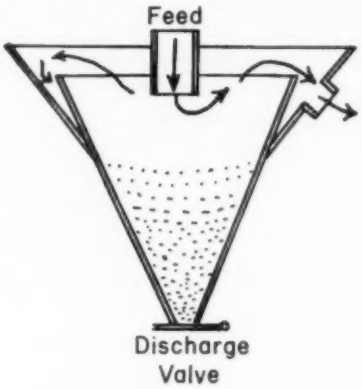


Fig. 10—An automated modern cone classifier.

Below: Fig. 9—A sketch of a simple cone type classifier.

Advantages — Settling Tanks —	Disadvantages
1. Simplicity of installation	1. Not a true classification
2. Simplicity of operation	2. Large space requirements
3. Low manpower requirement	3. Requirement for auxiliary equipment to reclaim settled sand
4. Low cost of operation	4. Loss of water by evaporation in arid and sem-arid areas
5. Ability to handle very large gallonages	5. Intermittence of sand production
6. Ability to handle large variations in gallonage and in sand content of feed	



(b) Early in the present century, J. V. N. Dorr invented and perfected the thickener for continuously separating sands from slimes in a cyanide plant. Conditions in the aggregate industry are somewhat different from those that prevail in the metallurgical industry, but a shallower variation of the thickener has been used with success — the hydro-separator.

This is a shallow circular tank, fed from the center, with a weir at the periphery of the tank. Because of its large pool area and weir length, solid particles settle readily along the bottom of the tank. Revolving rakes push this settled sand towards a center well, whence it is discharged by means of a controllable orifice. (Figure 1)

Because of the length of the weir, large amounts of water can be overflowed readily; because of the volume of the tank, variations in feed can be absorbed without ill effects; because the hydrostatic head on the discharge orifice is low and the sand is moved towards the discharge by the rakes, the amount of water discharged with the settled sand is small, and its ratio to the volume in the tank is low enough so that this does not disrupt the settling process. In those cases where the hydro-separator is used in the aggregate industry, its application is principally as a continuous dewatering device with the ability to recover fine materials. (Note the comparison following below.)

Advantages — Hydro-classifiers —	Disadvantages
1. Ability to overflow large gallonages without loss of desired fines	1. Not used as a classifier in the aggregate industry
2. Ability to absorb variations in feed tonnages and/or gallonages	2. Space requirements
3. Continuous operation	3. Cost of tank mechanism
4. Simplicity of operation	
5. Low operating cost	

Left: Fig. 11—The Floatex system of multiple cone classifiers.

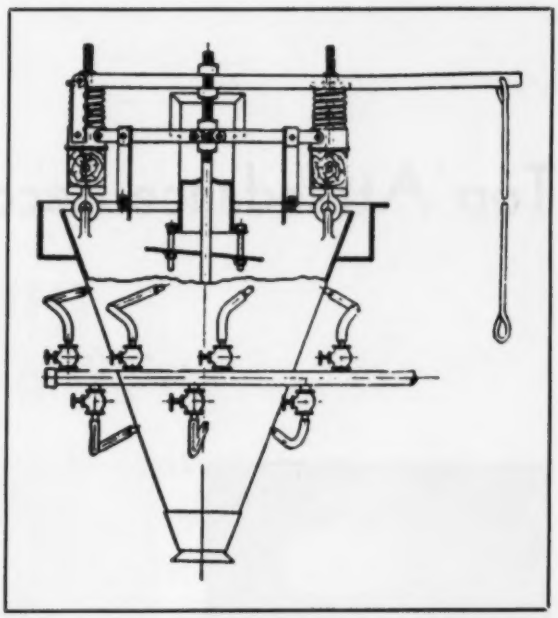


Fig. 12—A cone type classifier and dewaterer using hydraulic water.

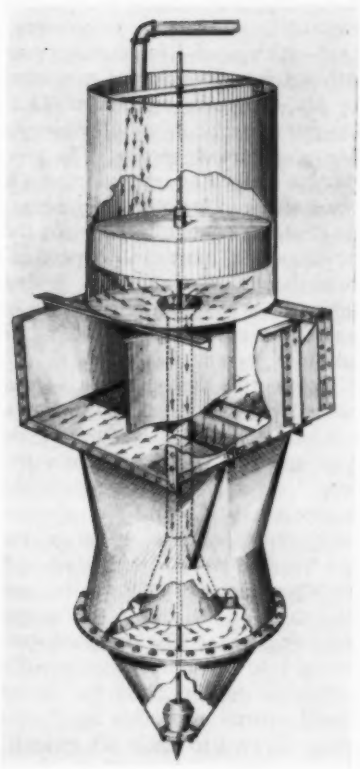


Fig. 13—A Shaw cone classifier with an automatic bottom unloading mechanism.

(c) Smaller hydro-separators have been combined with other forms of classifiers to provide larger pool capacities while using the "recovery" mechanism of these classifiers.

(1) The Auto-Vortex bowl uses a cone classifier, (Figure 2)

(2) The Desiltor uses a rake classifier. (Figure 3)

(3) One form of hydro-classifier uses a drag-conveyor. (Figure 4)

(4) Another form of hydro-classifier uses a spiral. (Figure 5)

Because of the cost of such installations and the increased complexity and cost of operation, their use in the aggregate industry is not too common. Devices perfected in the last few years may replace them since they appear to have more of the advantages and fewer of the disadvantages listed above.

A-2 Velocity Classification—Recovery by Bottom Unloading Three general types of these devices are in use: flumes; cones or pyramids; and cones or pyramids with hydraulic water.

(a) The classifying flume or launder is the simplest form of classifier using the principle of separation from a surface current. It is a descendant of the sluice box familiar to the miner of the Gold Rush days of California. But whereas the gold miner was interested only in the heavy particles which accumulated in the riffles and pockets and was able to stop shovelling into his sluice box long enough to clean up, the sand producer must operate continuously and recover all of the solids without disrupting the classification of the feed during his clean-up. Pockets were devised and enlarged, where the sand settling out of the current and sized according to the position of the pocket along the line of flow could accumulate

(*Continued on page* 114)

Top Attendance Record Set at

62nd Annual

Frank L. LaQue, president, A.S.T.M., 1959-1960, vice-president, International Nickel Company, Inc.

Miles N. Clair, vice-president, A.S.T.M., 1959-1961, president, The Thompson & Lichtner Company, Brookline, Mass.

A NEW record for attendance was established by members of The American Society for Testing Materials and guests, 3,128 registering for the 62nd annual meeting in Atlantic City, N. J., June 21 through 26. Growth in both membership and variety of interests has put A.S.T.M. annual meetings among the largest of scientific conventions, and hotel facilities for the hundreds of simultaneous general sessions and group meetings were strained to the utmost. In fact, there are so many interesting and diverse subjects being considered in so many places at the same time that the person with an inquisitive mind is likely to be frustrated in deciding which to attend and which to forego.

This year the emphasis throughout the program was on construction and road building. This can be readily understood when it is remembered that during the last year Professor K. B. Woods, head of the civil engineering department at Purdue University has been president of the Society. A special treat was afforded those attending the Highway Materials luncheon, sponsored by Committees A-1 on Steel, C-1 on Cement, C-9 on Concrete and Concrete Aggregates, D-4 on Road and Paving Materials, and D-18 on Soils for Engineering Purposes. The speaker, Ellis L. Armstrong, U. S. Commissioner of Public Roads, discussed the subject *Research—a Forward Look*. The amazing future of highway transportation, he indicated, is in the hands of persons such as those who make up the membership of the Society.

Quality Control

Improvement of concrete aggregate by the efficient removal of lightweight materials presented a problem at Glen Canyon Dam, a job which required the establishment of rapid systematic control testing. E. C. Higginson and G. B. Wallace, engineers, Concrete Laboratory, U. S. Bureau of Reclamation, prepared a paper which was presented by Mr. Higginson on *Control Testing for Separation of Lightweight Material from Aggregate*. The production method of separation used a water slurry of ferrosilicon and magnetite dense enough to float out the objectionable particles. Specifications based on preliminary testing limited the amount of aggregate having specific gravity of 2.50 or less to 2 percent.

To control the operation, a test procedure was developed using a mixture of acetylene tetrabromide (sp. gr., 2.97) and perchloroethylene (sp. gr., 1.63) to secure the heavy liquid. Control test samples of aggregate weighed 1,000 gr. for the No. 4 to No. 8 size in sand, and 5,000 gr. each of 1½- to ¾-in. and ¾- to No. 4 sizes of the coarse aggregate. The samples were brought to a saturated-surface-dry condition, immersed in the heavy liquid, stirred vigorously for 5 seconds, allowed to settle 15 seconds,

A.S.T.M. Meeting

highlights . . .

quality control
alkali-aggregate reaction
lime specifications revision
refractories
asphalt stripping test
quality and gradation
skid-resistance committee

By C. E. PROUDLEY
State Materials Engineer, Raleigh, N. C.

and skimmed for removal of the floating particles. Details of the apparatus and procedures for preparation and determination are described in a standard method of test form dated May 26, 1958, issued by the Bureau of Reclamation, which is a modification of A.S.T.M. Method C 123.

The paper prompted discussion from the floor. D. L. Bloem, associate director of engineering, National Sand and Gravel Association, observed that varsol has been used in the N.S.G.A. laboratory instead of perchloroethylene to reduce danger from the toxicity of the heavy chemicals.

E. W. Cummins, engineer in charge of the research section, Ohio State Highway Testing Laboratory, who was also the chairman of the third general session, at which the paper was given, pointed out that the overweight particles could be just as objectionable as lightweight materials in some instances. Bryant Mather concurred, and cited an instance in which processing was used to remove both lightweight and heavyweight particles from an aggregate in order to use the middle range, which had the more desirable characteristics.

D. O. Woolf, senior materials engineer, Bureau of Public Roads, inquired whether there is a special

J. A. Murray, Massachusetts Institute of Technology, chairman of Committee C-7 on lime. This committee recommended immediate adoption of a revision of the standard specifications for quicklime for structural purposes (C 5-26).

Bryant Mather, recipient of A.S.T.M. Award of Merit for technical and administrative work. He is supervisory civil engineer and chief, Special Investigations Branch, Concrete Division, U.S. Army Engineers Waterways Experiment Station, Jackson, Miss.

procedure for determining when the aggregates for test are in the saturated-surface-dry condition, since it had been indicated that this would affect the accuracy of the test. The answer was that no special test has been devised for this purpose, and that it is left to the judgment of the operator and his uniformity of repetition of the drying procedure.

Professor C. H. Scholer, Kansas State College of Agriculture and Applied Science, road materials laboratory, called attention to the similarity to the coal production problem, in which heavy fractions of slate and other noncombustible mineral matter must be removed before the coal can be marketed.

W. L. Dolch, Purdue University, described tests of four Indiana limestones, two having good resistance to frost action and two that did not, using determinations of the characteristics of the pore structures of cores and prisms of the rock. The limestones of poor quality had higher porosities, permeabilities, specific surfaces, and absorptivities than the better materials, and also had higher absorptivity-to-permeability ratios.

Alkali-Aggregate Reaction

Alkali-aggregate reaction continues to be a major problem for some producers, especially in conjunction with portland cement concrete uses. L. Pepper and Bryant Mather, Concrete Division, Waterways Experiment Station, Jackson, Miss., compared the chemical and mortar-bar test procedures using 20 materials representing 8 different classes of mineral admixtures: 2 types of slag, 2 natural cements, and 4 varieties of fly ashes. Three laboratories furnished data for the study.

A. B. Cornthwaite, A.S.T.M. director, engineer in charge of the Materials and Testing Div., Virginia Dept. of Highways.

E. W. Cummins, who presided at one of the general sessions sponsored by Committee C-9 on Concrete and Concrete Aggregates. He is the engineer in charge, Research Section, Ohio State Highway Testing Laboratory, Columbus, Ohio.

Mr. Mather, who presented the paper, showed correlations between effectiveness and: fineness, dissolved silica, and percentage of alkali retained by the reaction product. It is apparent, the author stated, that the chemical methods cannot be used with reliance and that the mortar-bar test procedure needs improvement to increase its precision.

A. D. Conrow, Ash Grove Lime and Portland Cement Company, asked for an opinion on the value of crushed pyrex glass as a material for the reduction of alkali-aggregate reactivity. It was stated in reply that crushed pyrex is the most standardizable material yet available, but that it is too expensive for use in construction. Professor Raymond Davis, Director Emeritus, Engineering Materials Laboratory, University of California, questioned further whether the pyrex glass does not give an exaggerated indication of the quantity and activity of the reactive materials present in an aggregate. Mr. Mather said that although this is true, the pyrex glass gives a better indication of the effectiveness of the mineral admixures.

Heavy Aggregates

Aggregates used in concrete for shielding nuclear radiations range from the ordinary to some that result in high costs per cu. yd.—$700 per cu. yd. in place. Its effectiveness as a shield depends primarily on the density of the concrete, and this can be varied by selecting those aggregates which have higher specific gravities.

At a session presided over by William Lerch, administrative assistant, Research and Development Division, Portland Cement Association, H. S. Davis, Hanford Atomic Products Operation, General Electric Company, Richland, Wash., gave information in a paper on characteristics of natural and manufactured ingredients used for concrete to be used in shielding from radiation. For example, siliceous and calcareous aggregates have specific gravities from 2.5 to 2.7; basaltic aggregate from 2.7 to 3.1; heavy ores such as barite 4.0 to 4.4; and magnetite, ilmenite, and hematite 4.2 to 4.8. Some heavy slags have gravities as high as 5.0 and ferrophosphorous and ferrosilicon, which are manufactured products, vary from 5.8 to 7.0. Iron bars, punchings, steel shot, etc., go as high as 7.8 specific gravity and are sometimes used in concrete for nuclear shielding.

Other considerations for shielding materials are their atomic weight, water present which may be in crys-

A. T. Goldbeck, engineering consultant, presided over the joint session of Committees C-9, D-4, and D-11.

talline form, oxygen as oxides—or to express it more directly, the absorption coefficients of the materials for fast neutrons and gamma rays, whichever are of most importance for the shield.

Lime Specifications Revised

Committee C-7 on Lime, of which J. A. Murray, Massachusetts Institute of Technology, is chairman, recommended immediate adoption of a revision of the Standard Specifications for Quicklime for Structural Purposes (C 5-26), by the addition of a new Section 2 entitled, "General Requirements," to read as follows: "2. *General Requirements.* — (a) Quicklime shall be slaked and aged in accordance with the printed directions of the manufacturer. The resulting lime putty shall be stored until cool.

"(b) Lime putty prepared in accordance with Appendix A4 (a) and adjusted to standard consistency according to Sections 6(b) and (c) of Methods C 110 shall show no pops or pits when tested in accordance with the method prescribed in Section 14 of Method C 110.

"(c) Lime putty prepared as above shall have a plasticity figure of not less than 200."

The *Appendix* to C 5-26 is revised also by inserting a new first sentence in paragraph A3 to read, "Quicklime shall be slaked in accordance with the printed directions of the manufacturer. Where such directions are not provided, proceed as follows." Paragraph 4A, Item (a) is then revised to read as follows:

"(a) *White Coat.*—After slaking and aging finishing quicklime according to the printed directions of the manufacturer, the putty shall be stored until cool. If no printed directions are provided by the manufacturer, the putty shall be prepared for use as follows:

"After the action has ceased, run off the putty through a No. 10 (2,000-micron) sieve, and store for the minimum of two weeks."

A Special Task Committee of Committee C-7 was appointed. This group consists of J. E. Gray, National Crushed Stone Association; R. B. Vogel, The National Lime and Stone Company, Carey, Ohio; and F. J. Mardulier, Dewey & Almy Chemical Company. They will determine the need for specifications for limestone to be used in agriculture and industry.

Douglas E. Parsons, elected to honorary membership in A.S.T.M., chief, Building Technology Division, National Bureau of Standards, Washington, D.C.

New tentative *Specifications for Quicklime and Hydrated Lime for Hypochlorite Bleach Manufacture* and also for *Pozzolans for Use With Lime* have been recommended by Committee C-7.

Refractories

Committee C-8 on Refractories under the chairmanship of J. J. Hazel, chief ceramic engineer, Republic Steel Corp., Cleveland, recommended revisions of the Standard Definitions of Terms Relating to Refractories (C 71-55) as follows:

"Raw Refractory Dolomite—Natural dolomite which is suitable for use as a refractory material.

"Calcined Refractory Dolomite—Raw refractory dolomite which has been heated to a temperature sufficiently high and for a long enough time to decompose the carbonate structure and remove volatile constituents.

"Dead-Burned-Refractory Dolomite—Raw refractory dolomite which has been heated with or without additives to a temperature sufficiently high and for a long enough time to decompose the carbonate structure so as to form calcium oxide and periclase in a matrix that provides resistance to subsequent hydration and recombination with carbon dioxide."

Stripping Test for Asphalt

Committee D-4 on Road and Paving Materials, A. B. Cornthwaite, chairman, devotes a large percentage of its time to bitumens and bituminous mixtures, but some of its most important considerations are related significantly to the properties of mineral aggregates. As pointed out in last year's report, much of the blame for lack of permanent adhesion of asphalt to aggregate is directed towards the aggregate. Years have been spent in an effort to devise a test which will indicate conclusively the affinity of aggregate for bitumen in a bituminous pavement, but with only slight success.

Nevertheless, this year the committee has published a tentative test method for coating and stripping of bitumen-aggregate mixtures. The "Scope" of the method is interesting in that it endeavors to caution the user of results of the test against applying them for the rejection of materials. It is a useful tool for the evaluation of a material in conjunction with other tests and service information and it is, perhaps, the best and most widely used test available for the purpose at this time. The "Scope" reads:

"Scope 1. This method describes coating and static immersion procedures intended to determine the retention of a bituminous film by an aggregate in the presence of water. It is applicable only to cut-back and semi-solid asphalts and to tars. It should not be used as a measure of field performance because such correlation has not been established (Note 1).

"Note 1.—No attempt shall be made to evaluate film retention below 95 percent. This is a limitation of the test method and does not intend to imply in any way that an aggregate-bitumen combination failing to retain 95 percent coating by this laboratory test will give unsatisfactory performance in the field. This test is suggested as a 'go-no go' test at the 95 percent level because its precision is not satisfactory for application at lower levels."

Quality and Gradation

In a joint effort, Committees C-9 and D-4 examined the Los Angeles abrasion test, Method C 131, for precision. In a co-operative series of tests nine laboratories reported

(*Continued on page* 113)

By BUREN C. HEROD

revised primary, surge addition spark *Increase in Production*

ANOTHER ON THE SPOT REPORT

ALTHOUGH it has been in operation only a little more than three years, the Gainesville Stone Company plant, at Gainesville, Ga., has already undergone a major revision resulting in increased efficiency of primary crushing and plant feed and in a jump of more than 50 percent in overall productive capacity.

Demands made by highway construction for base and sub-base materials and for concrete aggregates led to the construction of the original 250-t.p.h. operation—demands that currently account for nearly three-fourths of plant shipments. As originally installed, the operation incorporated a 30X42 primary jaw crusher from which the flow led directly to the following processing stage. However, markets outstripped expectations, and it became apparent to management that greater primary crushing capacity, plus provisions for surge and surge recovery, were necessary.

The first step involved relocating the quarry truck dump hopper, feeder, and primary crusher a short distance downslope from the original site. (The plant is located on the top of an extensive rise into which the quarry was opened.) Primarily, this provided for the most advantageous installation of a surge pile, but it also benefitted the truck haul to some extent. A 95-ft. long concrete reclaiming tunnel, housing a plate feeder, was then constructed, followed by the erection of the surge pile feed conveyor and the reclaiming conveyor that delivers to the original plant feed belt.

The original plant and the subsequent revisions to the primary phase were designed by the Smith Engineering Works and built by the Gainesville crew. Telsmith equipment is installed in all major processing phases, including the new 42X48 primary jaw crusher and its apron feeder, the double- and triple-deck screens, the secondary and tertiary crushers, and a twin-screw classifier. Flow between phases is carried primarily on Atlas and Barber-Greene conveyors.

Officers of the Gainesville organization have extensive backgrounds in contracting; and with an eye to the potential surge in aggregate requirements, they scouted a tri-state area for possible crushed stone operation sites. The Gainesville location proved well qualified in terms of both available raw material and markets. Core-drilling to a depth of 100 ft. indicated an extensive occurrence of biotite granite which would readily meet state and county specifications, and a tract of approximately 200 acres was acquired. The quarry, as noted previously, was opened into the side of a hill, and the plant was placed in operation early in 1956.

An accompanying view of the quarry illustrates the massiveness of the formation and the well-developed jointing. The latter contributes to the blockiness and good breakage of material brought down in blasting. Drilling of blastholes is done with a pair of tractor-mounted Joy TWM-3 Challenger drills equipped with 4-in. Brunner & Lay Rok-Bits. Three rows of holes on an 8- by 12-ft. pattern are sunk to a depth of 40 ft., and are charged with Atlas 60 percent explosives. The yield has averaged slightly over 2 tons per lb. of powder. Drilling air is

expanding markets dictate changes made at three-year old plant

Right: Not an idle machine. At the top of the ledge, two drills are sinking 4-in. blastholes. Two of the trucks are being loaded simultaneously by 2½-cu. yd. shovels. Secondary breakage is handled by dropballing.

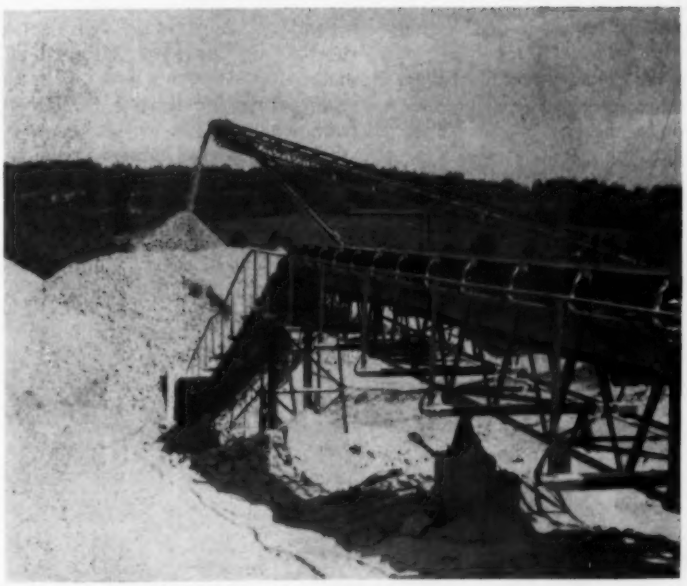
Left: Another view of the drilling operations. Blasting creates a 40-ft. ledge.

provided by Ingersoll-Rand 600 Gyroflo compressors.

Secondary breakage, when required, is handled by dropballing, and the quarry-run rock is loaded out by a pair of Northwest 2½-cu. yd. shovels for haulage to the plant hopper in three Euclid 63TD end-dump trucks. As dumped, the rock is transferred on the new 42-in. by 16-ft. apron feeder to the primary jaw.

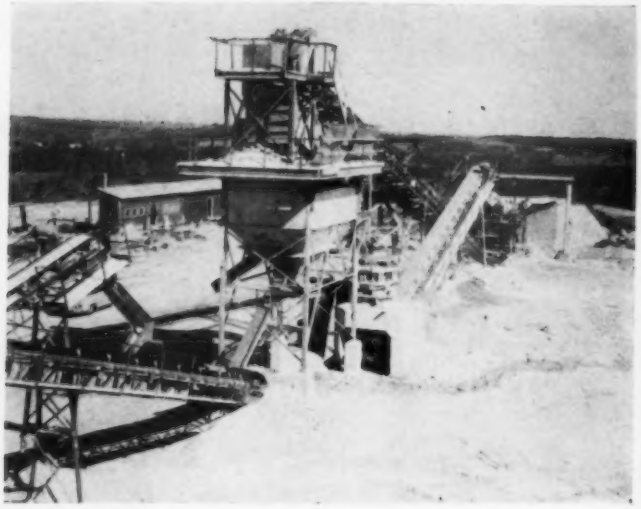
Products of primary reduction (minus 7-in.) are received on the inclined surge feed conveyor, which has a 42-in. belt on 210-ft, 6-in. centers. Approximately 15,000 tons of material is maintained in the surge from which recovery is made *via* a 60-in. by 8-ft. plate feeder in the reclaiming tunnel. The reclaiming belt, 36 in. wide on 150-ft. centers, transports the rock to a transfer point, from which it is delivered to the original plant feed conveyor.

On the latter, the crusher-run is taken to the primary scalper—a 5- by 14-ft. double-deck Vibro-King. Plus 4½- and 2½-in. fractions retained on the upper and lower decks, respectively, are both chuted



Minus 7-in. crusher-run stone is recovered from the surge via a plate feeder in the reclaiming tunnel. The tunnel belt transports the stone to a transfer point.

The new and larger primary jaw crusher was installed a short distance from the original primary station.



A view of the primary scalping and secondary crushing installation. In the background is the original primary crushing installation. The new surge reclaim belt connects with the plant feed conveyor at that point.

to the 489S Gyrasphere secondary crusher. Bottom deck throughs are dropped into the 50-ton Butler bin supporting the scalper and are chuted to the conveyor leading to the next phase. They may also be drawn from the bin for truck loading as crusher-run. Discharge from the secondary crusher is received on a 30-in. by 68-ft. return conveyor that closes the circuit in discharging to the feed belt.

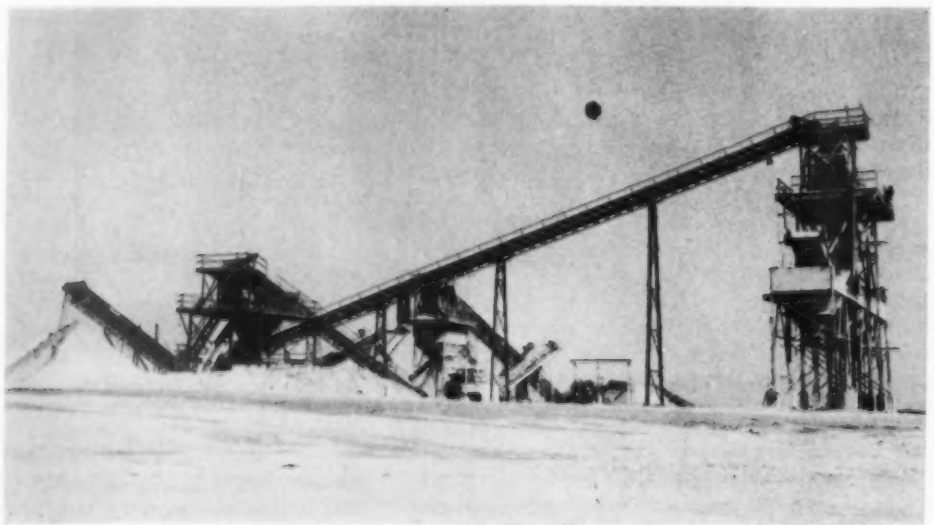
From the primary scalping stage, the flow passes on a 30-in. by 90-ft. conveyor to the secondary scalper. Identical to the primary Vibro-King, the secondary scalper is fitted with screencloth of 1¼-in. openings on the upper, and 1-in. openings on the lower deck.

Similarly to the primary phase, both retained fractions are chuted to a crushing stage in which tertiary reduction is done with a 48FC Gyrasphere. Products of the latter are returned in closed circuit to the secondary scalper feed belt on a short 24-in. conveyor. Minus 1-in. material passing the lower deck is received in an underlying Butler bin from which it may be chuted to a stockpile stacking conveyor, or to the 30-in. by 136-ft. belt leading to the washing screen tower. It may also be truck loaded from the bin.

The washing plant consists of a 5- by 14-ft. triple-deck Vibro-King screen, and a 24-in. by 19-ft. twin screw classifier — both mounted above a set of four Butler bins. A 6-in. pump delivers 500 g.p.m. of water to the spray bars of the screen and to the classifier.

Although a ¾-in. opening screencloth is normally used on the top deck of the washing screen, the cloth separating smaller fractions on

(*Continued on page* 110)



An overall view of the plant site. At the left is the secondary scalping and tertiary crushing phase.

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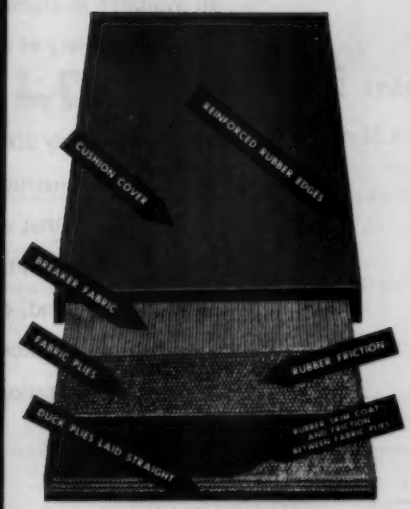

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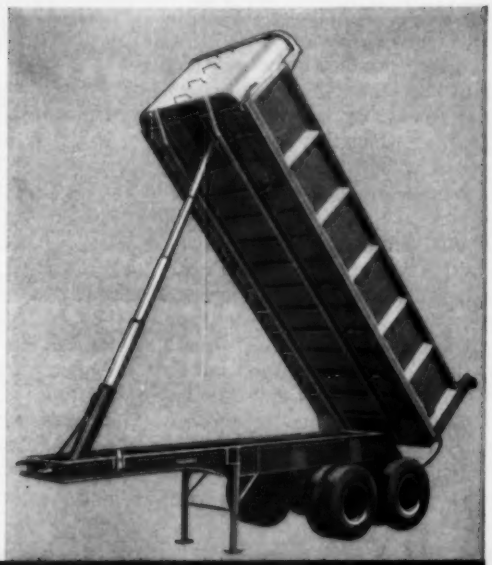
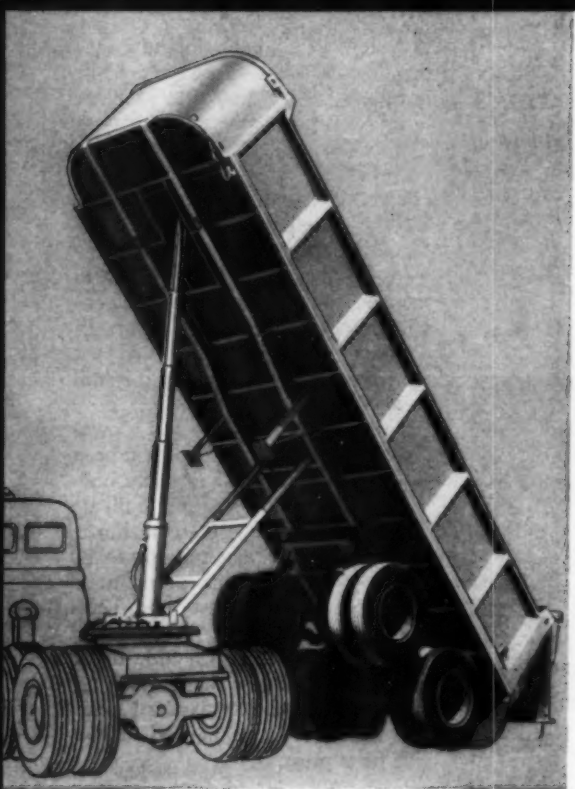
Front Mount Telescopic (Single or Twin)





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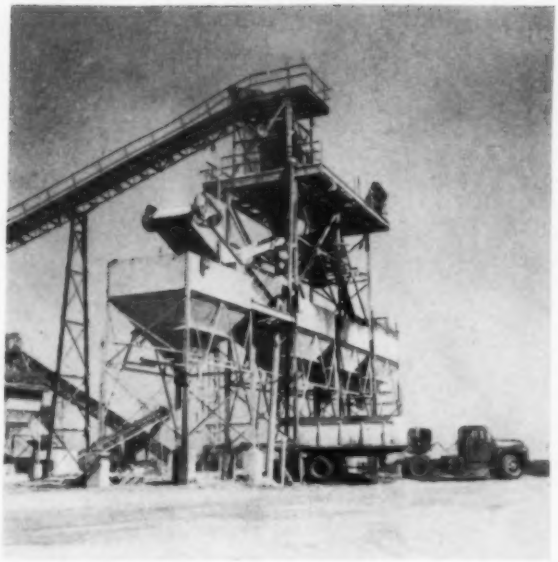
Gainesville Revises Primary

(*Continued from page* 106)

the lower two decks may be varied. All three retained fractions are delivered to the respective underlying bin, and the throughs are flumed to the adjacent classifier. Slime and tailings from the latter are flumed to a settling pond; and the dewatered, classified product (minus 4-mesh, for example) is discharged into the fourth bin.

Finished products may be loaded from these bins directly into customers' trucks, or hauled to stockpiles, from which they are rehandled for loading by Michigan and Allis-Chalmers front-end loaders.

From the approximately 400 t.p.h. of minus 7-in. material delivered to the surge from the primary crusher, the finishing plant produces about 225 t.p.h. of aggregates ranging from 1¼-in. to minus 4-mesh, in addition to crusher-run, and the unwashed throughs of the secondary scalper. In producing the three or four fractions marketed for batching plants and highway construction, all phases except that of primary crushing operate up to 16 hours a day. Ample surge capacity is provided for those operations by the primary crusher, which is in production 10 hours a day.



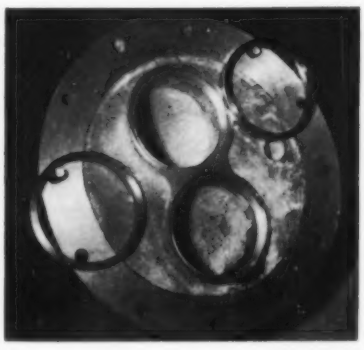
Four sizes of washed materials are processed here on a triple-deck screen and twin-screw classifier.

Heading this vigorous operation and the Gainesville organization are John W. Ruth, president, and Wallace M. Morgan, vice-president and general manager. Other officers include A. J. Ruth, treasurer, and J. G. Ruth, secretary. The plant crew is headed by A. F. "Scott" Anderson, plant superintendent.

Cement conveyor valves last longer
With centrifugally cast seat rings

Pneumatic conveying systems of the high-pressure type have long been a boon to the cement industry. Pumping through pipelines for distances greater than 3,000 ft. and hundreds of feet vertically as well, these systems can lift to great heights, making practicable the tall multiple cement-storage silos now in universal use in the industry.

It was discovered long ago that fine, abrasive cement fluidized with air in the pneumatic systems could cause wear in the distributing valve systems, eating into the cast-iron or steel valve parts.

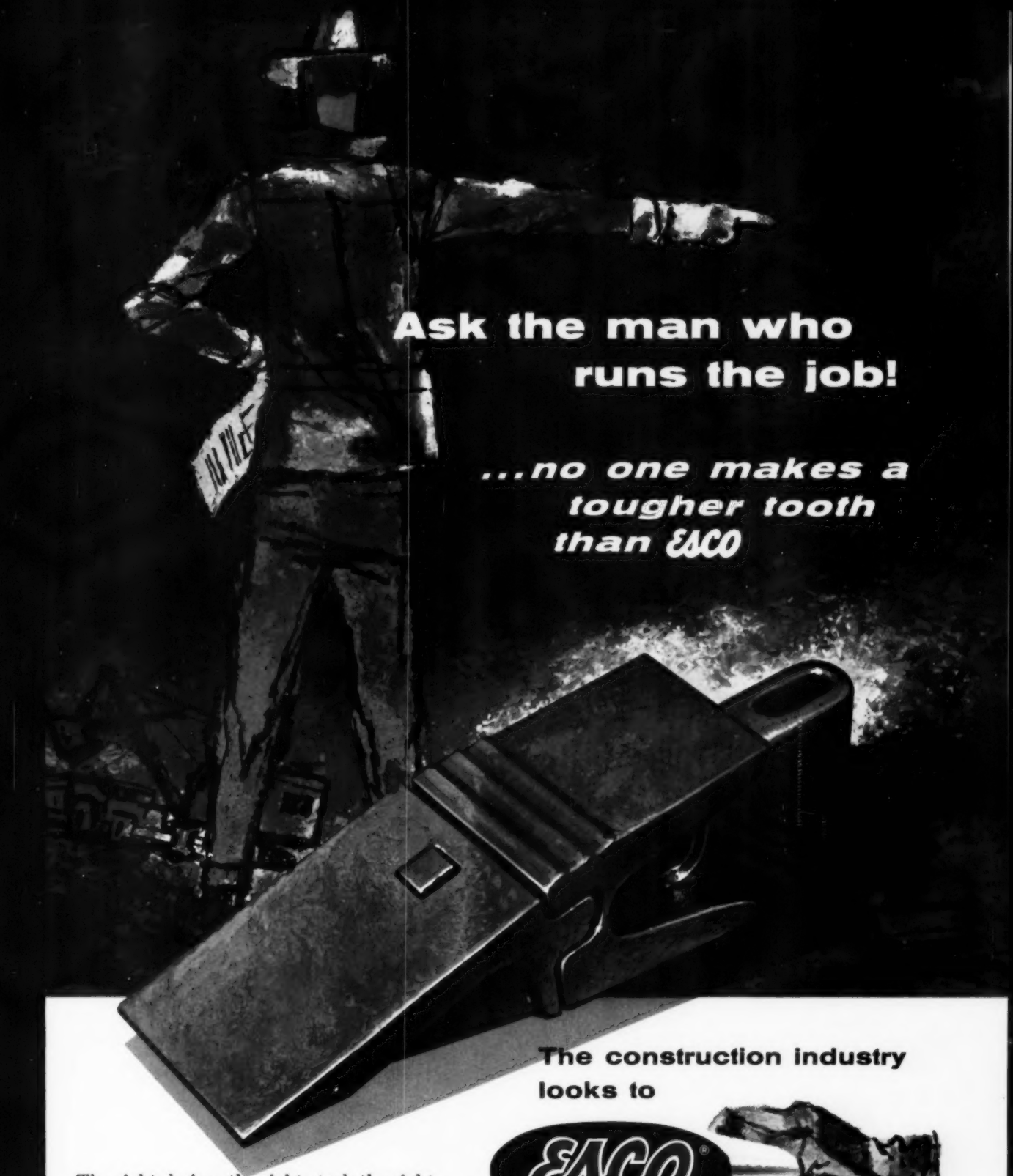


Left: A "Y" valve which was badly cut out after about 60 days of service. Right: The same valve after rebuilding and machining to take the two seat rings shown.

A few years back the management of a Western cement plant faced up to this annoying problem in its operations, where 70 or more 5- to 8-in. single, "Y," and 3-way valves were incorporated in the system. With the co-operation of Stoody Company, pioneer hard-facing manufacturer, specifications were drafted, calling for a replacement valve seat which could be centrifugally cast of Stoody 1 alloy. In January, 1952, the first of such seat rings went into service, and it is still in service!

Formerly the labor and down-time for valve maintenance had been costly. Cut-out areas of valve bodies and flanges, which were built up with hard bronze and remachined, lasted on the average only 60 to 90 days. Now the same parts, fitted with centrifugally cast seats, cost less and are good for many years of continuous service with little or no attention. The seat rings, which are stocked in various standard sizes, are accurately machined after casting for a press fit.

Enter 111 on card, page 145 ➔



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The construction industry looks to

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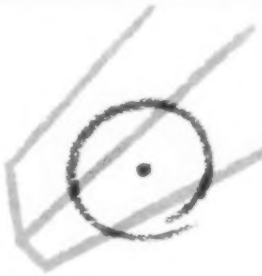

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8 POINT SHAPES

You can select from eight different shapes to find the point that matches your digging conditions. *ESCO* Points are designed by bucket and excavation specialists who know how to achieve top digging performance. The self sharpening design of an *ESCO* Point makes it start sharp and stay sharp.

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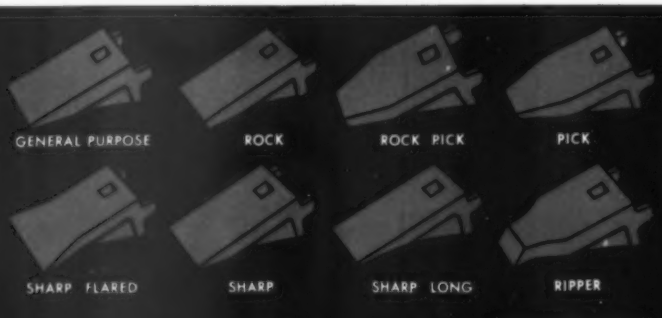

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A.S.T.M. Meeting

(*Continued from page* 103)

percents of wear from 21.8 to 30.2 on the same aggregate, much to the dismay of many who had been in the habit of considering this test as one of the most conclusive means for evaluating the quality of mineral aggregates.

A comprehensive report by D. O. Woolf, Senior Materials Engineer, Bureau of Public Roads, was presented to Subcommittees III-e and B-12 of Committees C-9 and D-4, respectively, which indicated that one of the most critical details of the test method is the speed and uniformity of rotation of the abrasion testing machine. Other variables contribute to the lack of agreement; and it is obvious that the method, especially the machine, must be revised to minimize differences introduced by the free interpretation of the description of the method as now written.

Another joint effort of Committees C-9 and D-4 is the rewriting of the *Method of Test for Sieve Analysis of Fine and Coarse Aggregates*. It may be several years before final revisions are adopted, but it is interesting to learn that there is some lack of agreement among testing engineers in the interpretation of whether a determination of the amount of material finer than No. 200 sieve in aggregate (C 117-49) should be made on all aggregates before performing the sieve analysis of fine and coarse aggregates (C 136-46), and whether the amounts of material passing the No. 200 sieve by the two methods are to be combined in making a report of the grading of the aggregate. This can be a serious matter to the producer of mineral aggregates, and to the user as well.

Evolution of a New Committee

It may be recalled that last year a paper of much interest was presented by Shupe and Goetz, Purdue University, on *A Laboratory Method for Determining the Skidding Resistance of Bituminous Paving Mixtures*. During the year an international conference on factors involved in skidding was held at the University of Virginia. It was sponsored by A.S.T.M., the Joint Highway Research Project of Virginia, the Highway Research Board, and other groups, which agreed that it was obvious that the problem was very involved and a continuing one.

With this opinion in mind, Committees C-9 on Concrete and Concrete Aggregates, D-4 on Road and Paving Materials, and D-11 on Rubber and Rubber-Like Materials called a joint session presided over by A. T. Goldbeck, Engineering Consultant. Those present agreed to request the board of directors of the Society to establish a Committee in the E group on the tentative subject of skid resistance of pavements. The work of this committee will be of primary interest to all producers of mineral aggregates for use in road surface construction.

Committee C-16 on Thermal Insulating Materials has succeeded in having adopted a new Tentative Specification for Amosite Asbestos Insulation for Pipes (C 391-59T). It will appear in the 1959 *Supplement to Book of A.S.T.M. Standards*, Part 5. Under the guidance of Chairman W. C. Lewis, U. S. Forest Products Laboratory, Madison, Wis., Committee C-16 recommended for publication (as tentative) methods for (1) Determining the Maximum Use Temperature of Preformed High Temperature Insulation, and (2) Breaking Strength of Preformed Thermal Insulation for Pipes.

Honors

Readers of PIT AND QUARRY have reason to feel personally acquainted with many of the leaders in materials research whose names appear frequently in these pages although they may never have met them face to face. A.S.T.M. honors these outstanding workers in several ways, among the highest of which is election to honorary membership. Douglas E. Parsons, chief, Building Technology Division, National Bureau of Standards, Washington, D. C., was so honored this year, thereby becoming the 29th to be accorded this signal honor.

Distinguished service to the Society, especially along technical lines, has been recognized each year for the last 11 years by the Award of Merit. This year 13 leaders in the field of engineering materials were given the award, among them Bryant Mather, supervisory civil engineer and chief, Special Investigations Branch, Concrete Division, U. S. Army Engineer Waterways Experiment Station, Jackson, Miss., in recognition of intensive and consistent activity in A.S.T.M. technical and administrative work, especially notable in Committee C-9 on Concrete and Concrete Aggregates.

Another recipient well known to the nonmetallic minerals industry was Henry J. Schweim, western manager, Gypsum Association, Hollywood, Calif., for his valued and sustained participation in A.S.T.M. work, especially in Committee C-11 on Gypsum, and for his long-time secretarial work for that committee.

Beaumont Thomas, director and vice-president for development and research, The Stebbins Engineering & Manufacturing Company, Watertown, N. Y., received the Award of Merit also, in recognition of faithful and constructive leadership in all of the technical work of Committee C-3 on Chemical-Resistant Mortars, and for administrative support as secretary and chairman of Committee C-3.

New Officers

Newly elected officers of the Society include familiar names. F. L. LaQue, vice-president and manager, Development and Research Division, The International Nickel Co., advanced to the presidency of the Society, succeeding Professor K. B. Woods, head, School of Civil Engineering, and director, Joint Highway Research Project, Purdue University. Miles N. Clair, president, The Thompson & Lichtner Company, has been elected a vice-president of the Society; and Dr. A. Allan Bates, vice-president of research and development, Portland Cement Association, will continue as senior vice-president of A.S.T.M.

A. B. Cornthwaite, testing engineer, Commonwealth of Virginia Department of Highways, was elected to a three-year term on the board of directors.

Since the formation of American Cement Corporation late in 1957, the firm's directors have approved capital expenditures of about $33,000,000. Approximately half of this sum was spent during 1958, and the remainder will be spent this year. Total investment in plant and equipment in the two years has risen from $67,000,000 to $100,000,000.

Classification Methods

(*Continued from page 99*)

and be discharged. Although the hydrostatic head is low, the opening of the discharge valve will let enough slurry flow through (at times it is even necessary to flush out the accumulated sand) to completely disrupt classification further downstream. Furthermore, the slurry discharged with the sand adds unsized solids and an appreciable amount of water and slimes to the settled and sized material from the pocket. (Figure 6 on page 97)

Many of these simple devices are still in use, but this is only because many areas are very lax in their specifications. Wherever definite requirements as to sizing and quality are imposed, the classifying flume is obsolete. (Note comparison above, right.)

(b) The modern scalping tank is the result of a series of improvements in the classifying flume. (Figure 7 on page 97) The first disadvantage, that of the length of the flume, and of space requirement, was overcome by widening the flume to dimensions limited by transportation of the tank without disassembling. This allowed for a longer weir, gave the tank an improved dewatering capacity, and slowed down the velocity of the surface current. However, this change has its own disadvantages, since, with the shortening of the length of travel of the falling particles in their parabolic path, there is less sharpness in the separation of the size fractions along the length of the tank than there was in the flume.

Advantages — Classifying Flume	Disadvantages
1. A classifying device	1. Length of flume required for classification
2. Low cost of installation, low cost of operation and maintenance	2. Classification disrupted during clean-out
3. Simplicity of operation	3. Need for manual operation

The greatest improvement was in the recovery phase of the operation. The settled sand is concentrated by troughing the bottom of the tank. As it accumulates in the vicinity of the discharge ports, a probing device senses this accumulation and opens the discharge valve long enough for the accumulation to be drained off. By proper adjustment of the probe and of the valve actuator, the interval during which the discharge valve is opened can be reduced to a minimum, all the more so since the hydrostatic head above the valve will enable the liquid in the tank to flush the sand out more rapidly. This automation has reduced the manpower requirement of the classifying flume, but sharp classification with the scalping tank is impossible.

Provided that certain precautions are observed in the introduction of this machine in the sand washing plant circuit, the scalping tank is the only device available at this time to meet certain problems peculiar to the production of fine aggregates.

The two most important factors to be considered in the engineering layout of the scalping tank are: 1) reduction of the initial velocity of the slurry to a minimum, so that the velocity of the surface current is just enough to carry undesired solids over the weir; and 2) provision for limiting variations in feed gallonage so that the variations in velocity flow over the weir, which determine the separation in the tank, are kept below that amount which will cause a falling particle to report to a discharge port other than the one to which it would normally go.

If these two factors are present, the scalping tank will:

1. Remove intermediate size fractions in excess ("bellies")
2. Allow the same raw feed to be simultaneously reblended into products of different size consist

Although sharp classifications cannot be obtained, the ranges in gradations of the sands discharged from different ports is distinctive enough so that by use of the splitter gates, excesses in one or more fractions can be bled off with minimum loss of material, the remainder being recombined with those gradations which meet specifications until the desired product is obtained.

In the same way, by reblending proportionate amounts of the different fractions discharged by each port, and making use of the multiple flumes into which the splitter gates may feed, it is entirely possible to make a concrete sand and a mason sand at one and the same time.

The fact that the scalping tank is unloaded from the bottom means that the product will contain a certain amount of water, and at times, entrained slimes. The liquid content always exceeds 30 percent, and a suitable dewatering device must be provided, albeit a much smaller one than would be required to treat the original feed, since excess liquid has been removed and a smaller pool area is required. (See comparison at left. Also, Figure 8, page 97)

Advantages — Scalping Tank	Disadvantages
1. Classification from surface currents: simple control	1. Classification not sharp
2. Ability to handle wide range of gradations	2. Need for dewatering of products
3. Ability to handle very dilute slurries	3. Need for reduced initial velocity of flow
4. Ability to iron out bellies in gradation curve	4. Variations of feed gallonage limited
5. Ability to produce more than one specification at the same time	5. Headroom requirement
6. Automation reduces manpower requirements	6. Cost of installation and auxiliaries

(*Continued on page 118*)

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2 WAYS TO DUMP — During *instantaneous gravity dump* . . . operator releases fast by-pass of fluid in hydraulic cylinders . . . gravity takes over . . . dumps load instantly. Or, operator can apply *controlled gravity dump.* Hydraulic system acts as a retarder. Gravity actually tilts the body . . . hydraulic pressure controls the rate of discharge.

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. . with dual controls, pivoting seat, 20.8 mph speeds in both directions

- **Two steering wheels, throttles, brake pedals . . . one each located at *both* operating positions of *pivoting* seat.**
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5918

Classification Methods

(*Continued from page 114*)

(c) The second general type of velocity classifier with bottom unloading is also a development of the classifying flume. But in this case research concentrated on improving the capacity of the pockets, thus developing cone classifiers and pyramidal tank classifiers. (Figure 9 on page 99)

Because of their restrictions on the length of travel of particles, baffles and other artificial brakes on the velocity of the current had to be used. The discharge of the accumulated sand, however, remained the main problem. This was done periodically, either by manual control of a discharge valve at the apex of the cone, or by hinging the entire cone so that when a certain weight of sand accumulated, the entire cone moved and emptied. Or else it was done intermittently by automatic discharging of the sand when it had reached a certain level in the cone, or when the weight of the accumulated sand plus that of the slurry actuated a linkage, or even in certain rare occurrences by the gradual increase in the specific gravity of the slurry in the cone as the accumulated sand pushed the heavier bottom layers of the slurry towards a predetermined level. (Figure 10 on page 98)

Advantages — Cones — Disadvantages

Advantages	Disadvantages
1. Classification device	1. Difficulty of control due to complexity of currents used
2. Lower head room requirements	2. Sand produced will be very wet and require dewatering
3. Flexibility of design in location of multiple units	3. Large volumes of water entrained in sand discharge will disrupt classification
4. Multiple units can be used for bleeding off excess fractions	4. Variations in feed gallonage will change classification conditions
5. Multiple units can be used to produce several specifications simultaneously	5. Restrictions on dimensions because of weight factors
6. Low cost of installation and operation	

A series of cones can be spotted in a flume in such a way that the sand accumulated in the succeeding cones will have a finer gradation as the coarser sizes are removed in the preceding cone, much in the manner of the scalping tank; or a group of cones could be used for the removal of "bellies" or for the reblending of several specification products. (Figure 11 on page 99)

Certain disadvantages are inherent to this type of classification: a) the volume of sand in the cone is very much larger in proportion to that of the slurry in the cone; to maintain its effectiveness, especially since a part of the cone volume is used to reorient the surface current into a rising current, it must be drained of accumulated sand at frequent intervals; b) because of low hydrostatic head above the discharge valve, the flow of sand out of this valve will be slow and require a longer open valve time, or else a large volume of slurry will be entrained, since its head will be low, to flush out this sand; c) variation in feed gallonages will have immediate repercussions on the classification, since not only will surface current velocities vary, but also those of the rising currents; and d) dimensions of these cones, or pyramids, will be limited by practical considerations. (See above)

(d) A variation on the preceding cones uses an auxiliary current of hydraulic water to supplement the rising current effect of the diverted stream; this is called hydraulic water. Although conditions approach those which prevail in a hindered settling classifier, the principle in use is still one of velocity classification. These complicated installations are not common in the aggregate industry. The main characteristics are the same as those listed in the preceding section, with the added complication that the hydraulic water stream requires close regulation in order to obtain classification. (Figures 12 and 13 on page 99)

Part II will appear in a subsequent issue.

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American Cancer Society

Southern Cement Company, Birmingham Ala., a division of American-Marietta Company, recently completed installation of a 1,250,000-bbl. kiln at its Roberta, Ala., plant. This is the second large rotary kiln to be installed at Roberta within two years.

Record sales for the six month period ending May 31 have been reported for American-Marietta Company. Sales totalled $142,722,984, or 36 percent higher than the $105,046,581 recorded for the simlar period last year.

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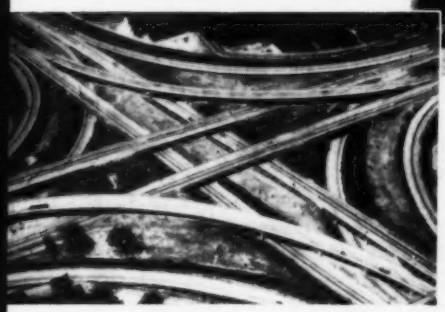
Right: This dramatic view of Shasta Dam in California demonstrates the progress made by construction engineers in conserving water supply, preventing flood destruction and providing water needed to make arid land useful again.

Above: To meet the challenge of the jet age, engineers and contractors are being called upon to build and expand airport runways to handle increased traffic. (View shows Lambert Field, St. Louis.)



Above: This view of one of the interchanges on the high speed Detroit expressway is a striking example of the contribution the construction industry is making to the tremendous highway program.

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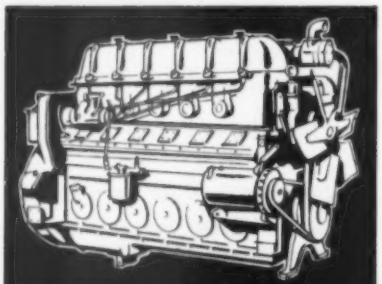

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Recently I listed several outstanding and unusually important higher court decisions having special interest for manufacturers, buyers, sellers, distributors and users of nonmetallic products. I shall review them here because these new citations may be advantageously utilized by readers and their lawyers to win favorable verdicts in unavoidable law suits.

The decisions cited are briefly explained below, and readers who desire to read any complete decision may do so in any good library, simply by referring to the specific citation.

Assessed Value Not Important

A few weeks ago a higher court rendered an outstanding decision stating that the value of land is not the amount for which it is assessed for taxation purposes.

For instance in *United States* v. *Smoot Sand & Gravel Corporation,* 261 Fed. Rep. (2d) 287, the testimony showed that a lower court awarded the Smoot Sand & Gravel Corporation $324,000 as compensation for a tract of land taken by the United States in condemnation for construction of the George Washington Memorial Parkway.

An important reason that the lower court awarded this amount of damages to the Smoot Sand & Gravel Corporation is that the area appropriated consisted of 113 acres of land on which the company had been paying taxes based on the assessed value of the land for $324,000.

The higher court reversed the lower court decision, saying that the assessed value of land when it is placed upon the land by assessors is not admissible as evidence of the market value of the land. This court said further:

"Unquestionably, the law is that the valuation placed upon property by a public official for purposes of taxation only is not competent evidence to go to a jury on a litigated question of the value of the land."

City Condemns Profitable Property

The owner of a concrete block plant has asked an interesting question concerning whether or not a state, county, or city can condemn and appropriate his plant, which nets a high annual net income, without paying the actual worth of the property.

According to a late higher court decision, a state, county, or city can condemn and appropriate for public purposes any property if the owner is paid its present value. On the other hand, the property owner will not be permitted to introduce as evidence the net profits he earned from operation of the business or plant in order to increase its valuation.

For instance, in *Land Clearance Commission* v. *Darrow,* 146 N. E. (2d) 1, the testimony showed that the slum clearance commission of a city appropriated certain property. The owner, named Darrow, appealed to the higher court that the jury had fixed the sum of $65,000 as fair compensation for the property, but that the property actually was worth $135,000.

It is interesting to observe that the higher court approved the jury's $65,000 allowance. This higher court refused to allow Darrow to introduce as evidence the net income derived from operations of the business. This court said:

"The measure of just compensation for property condemned is the fair, cash market value of such property at the time of eminent domain proceedings. Evidence of net income derived from operating business on condemned property is not admissi-

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At Corder Sand and Gravel:

Base materials for this operation near Dallas, Texas, are taken from the Trinity River bottom. They use the versatile Model H-70 "PAYLOADER" tractor-shovel to stockpile sand and gravel, load trucks, grade roads and, in addition, do a lot of miscellaneous lifting and carrying chores.

* Owner John Corder says:

"This is the loader I've been looking for since I went into this business. We bought the H-70 following a competitive demonstration that proved its superior performance. It has everything — 4-wheel drive with no-slip wheels for the soft, wet conditions we have in the river bottoms, a powerful engine for speed, heavy duty digging and power to get us through deep powdered blown sand. I am very pleased with the H-70 and find new uses for it every day."

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NEW LITERATURE

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ble and is not the basis for fixing compensation."

Don't Rely Upon Permit

Last month a higher court rendered an outstanding decision which answers a question asked by readers at various times. The question is: "If an authorized city official issues a permit to a property owner to construct and conduct a business building in a residential district, can the property owner go ahead with confidence and expend money in construction of his proposed building?"

This new higher court clearly answers this question in the negative.

For illustration, in *Howard* v. *Etchieson,* 310 S. W. (2d) 473, the testimony showed facts, as follows:

One Howard applied to the city engineer for a permit to construct a business building on lot B in a prescribed area. In this residential area, a city ordinance makes it unlawful to erect any building to be used for business purposes if property owners in the immediate vicinity protest.

Later, at a hearing before the council, a motion to deny the permit failed to pass, whereupon the mayor of the city declared the permit would be granted. Subsequently the city engineer issued a permit to Howard to construct and operate a business building on lot B in this residential restricted area.

Soon afterward several persons who own homes in the immediate vicinity filed a suit alleging that the city engineer acted without proper authority in issuing a permit, and that the establishment of the proposed building on the lot in question would create and constitute a nuisance causing irreparable injury to appellees.

Howard argued that he was relying upon the permit which had been issued by the city engineer and that, in view of this permit, he could not be prevented from constructing and operating a business on lot B.

The higher court held that it was not important that the city engineer had issued a permit to Howard, and that Howard could not construct a business building and operate a business on lot B.

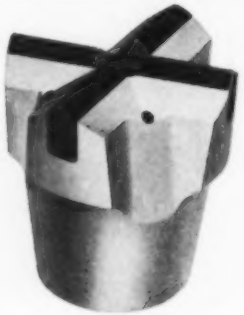
Factory Is Needed

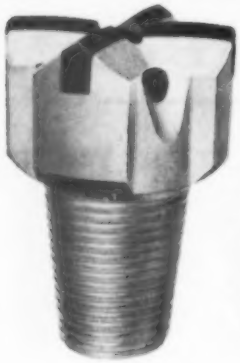
In answer to a question presented by an official of a cement plant, I located a recent higher court decision which held that all owners of homes in close proximity to a factory or manufacturing plant can expect to smell odors.

For illustration, in *Borgnemouth* v. *Gulf Corporation,* 31 So. (2d) 488, the testimony showed that a company erected a new plant at a cost of more than $100,000. It did emit some offensive odors and dust, due largely to the company's inability to secure proper machinery to suppress them.

The owners of ten nearby dwellings sued the company for heavy damages. The court clearly explained that neighboring residents have a legal right to the enjoyment of their property, and that a "nuisance" must be abated. On the promise of the officials to subdue the dust and odors, the higher court held the company liable in nominal damages of $250 to the owner of only one nearby dwelling. The court said:

2 NEW PRODUCTS* from Brunner & Lay





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Enter 122 on card, page 145

"It appears that the defendant (corporation) has been making every possible effort to remedy as many of the objectionable features of its operations as it would under existing conditions. . ."

This court went on to explain that the evidence does show that because of the condition of the plant, and the method of its operation, nauseous and offensive odors have been emitted from it, causing much discomfort to those residing in the neighborhood and unreasonably inconveniencing them in the reasonable enjoyment of their property. Nevertheless, since the company is making every effort to eliminate the nuisance, it must be given the benefit of its efforts.

For comparison, see the leading higher court case of *Soap Corporation of America* v. *Balis,* 223 S. W. (2nd) 957. In this case the higher court held that 72 owners of dwellings near a soap factory could collect $1,500 each, plus a 33⅓ percent depreciation in their property. The testimony showed that the damages were caused by the grinding and processing of soap in the vicinity of these homes. The process emitted odors that smelled like dead fish, dead cattle, or similarly decayed material. Also, the testimony showed that the operation of such a plant produced foul and obnoxious odors that spread into the homes, settled on their clothing, and prevented the enjoyment of the residents' homes. This court said:

"It is the law that a person cannot be driven from his home or forced to live in uncomfortable surroundings by the unlawful acts of a company which, without due regard to its neighbors' rights, erects a plant in the midst of a residential section that will, regardless of the care it may take in its operations, allow obnoxious odors to emanate therefrom causing discomfort to those in the immediate surroundings."

Must Prove Damages

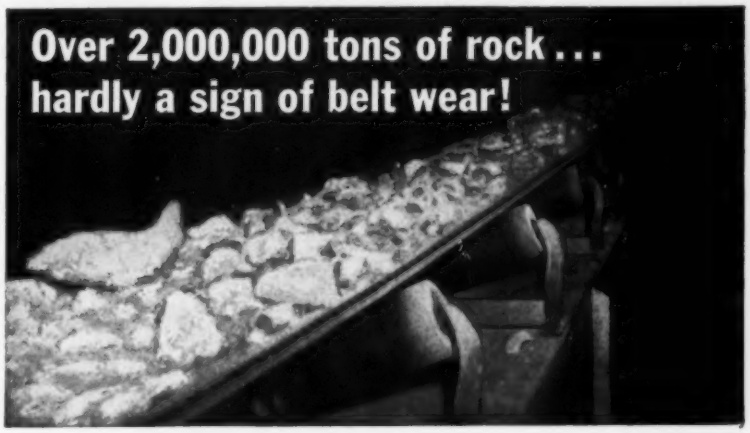
Modern higher courts consistently hold that a company or person who seeks damages must prove that the party being sued actually effected the alleged damages, otherwise no favorable verdict will be awarded.

For instance, in *Hara Company* v. *Frederickson Building Corporation,* 88 N. W. (2d) 643, the testimony showed that the Hara Company sued the Frederickson Building Corporation for $27,290, the balance claimed to be due on a contract for material and labor.

The constructing company asked the court to allow it $106,789.65 damages against the Hara Company, claiming that the latter had caused this amount of damages while performing its contract.

Since the constructing company failed to prove definitely that acts of the Hara Company had caused the building corporation $106,789.65 damages, the higher court awarded the Hara Company the $27,290 against the building corporation and refused to hold the Hara Company liable in $106,789.65 damages. The court said:

"A party (Frederickson Building Corporation) who claims to have been damaged by a breach of a contract is required to prove the amount of his damage." (*Turn to page* 126)



That's the story behind the New York Rubber Stonore Nyrex conveyor belt, in regular, daily use by a large stone company. In this crushed stone plant, this heavy-duty belt carries stone from the primary crusher, located under the floor of the pit, over a belt distance of 455 feet at a 19° angle.

A belt *has* to be good to stand the tension required here *and* hold up under the abrasive effects of the crushed stone at the same time! Yet, this is the kind of service that is expected—and achieved regularly—with conveyor belting manufactured by New York Rubber Corp.

Take Stonore, for example. Highest in quality, mildew-proof, and built for the most severe service, it successfully handles heavy ores, trap rock, crushed stone, coarse broken glass, slag, cement clinkers, and direct feed from digging and mining machinery. It is also available as a special mucker belt.

If you want the service that this belt provides — or need any other type conveyor belt — it will pay you to consult New York Rubber. Drop us a line — there's no obligation. Address: Department PQ-4.

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How would you load rock this size?

Shoot to size? Cable and lift? Shovel?

There are only two tractor shovels in the business built for work like this . . . the Allis-Chalmers 225-hp, 4-yd HD-21G and the 150-hp, 3-yd HD-16G. They're in a class by themselves. If you move ore, rock, gravel or overburden . . . if you need a machine that will pioneer, rip, load and handle a multitude of jobs, see them in action. They'll go it alone or team up with other machines to help improve your profit.

Increase bidding power—You're way ahead in bidding flexibility with a big-capacity tractor shovel. Jobs miles away are simple transport operations with Allis-Chalmers BIG tractor shovels. Forget about expensive dismantling, problem loading, hauling and setup again at job site.

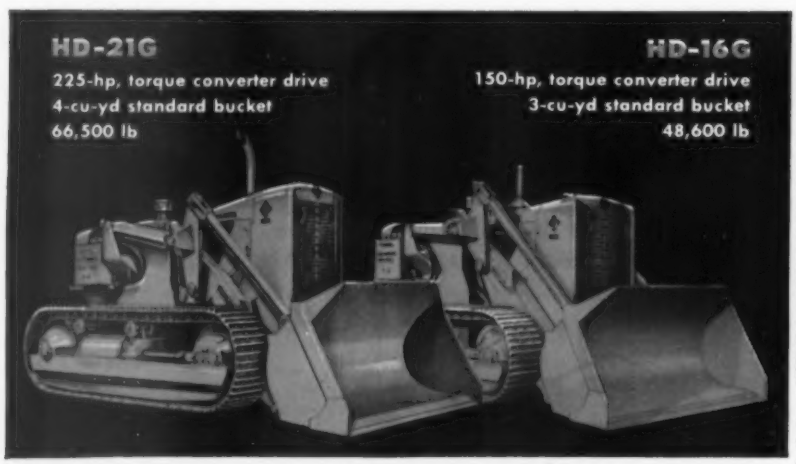
Handle scattered jobs economically—*Wherever* there's loading to do on a new job, these two dependable units "walk" to work . . . through mud—over rough terrain—those spots where *only crawlers* can go! They build their own roads—dozing, cutting, filling, compacting . . . load up to 4 yd at a clip*

What's more . . . BIG HD-21G's—16G's are not single-purpose units. They're pioneering machines. They'll open up new cuts or make quick work of clearing, piling stumps, brush or boulders. And, of course, loading, stockpiling and cleanup are their steady specialties.

They're ripping specialists—Long track, outstanding balance and power enable HD-21G's—16G's with rear-mounted Tractomotive rippers to open up tough material over *two feet deep*. Enough hydraulic penetrating pressure is developed to lift the tractor itself off the ground.

You *can afford* to use these big tractor shovels on many utility chores—from breaking up concrete roadbeds with 72,700-lb break-out force, to complete one-man, one-machine demolition operations. When you apply the abilities of the HD-21G—HD-16G to your own jobs, you'll see how either one or both of these production units can cut costs . . . put a *sharper point* on your favorite bidding pencil.

See your Allis-Chalmers dealer—He's the ONLY man with tractor shovels from 72 to 225 hp . . . from 1½ to 7¼ yd. He'll be happy to fill in the details—show you an Allis-Chalmers tractor shovel in action. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

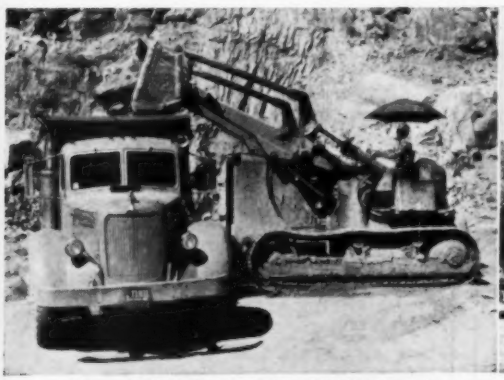


*Special-purpose buckets available up to 7¼ yd.

Walk to work—This Allis-Chalmers HD-21G makes its own way to rugged, inaccessible working areas . . . can "walk to work" where *most* units with 4-yd capacity would have to be brought in piecemeal.

. . . move ahead with ALLIS-CHALMERS

Big Allis-Chalmers tractor shovels are built to handle rock this size with ease and durability. Watch one work—or ask the man who owns one about the *capacity, versatility,* and *easy transport* they offer . . . *three* of the most desirable profit characteristics you'll ever find in *any one machine!*



One-machine fleet — This HD-16G handles a wide variety of pit and quarry jobs . . . not only loading big trucks with ease . . . but clearing new areas, cutting access roads, stockpiling and cleanup as well.

No problem loading—Moving from job to job quickly with the HD-21G and HD-16G adds even more value to these two heavy-duty tractor shovels.

A-C . . . . . power for a growing world

Legal Decisions

(*Continued from page* 123)

Also, the court awarded the Hara Company payment for gravel, and said:

"Without designating it by item number, item 2 is for graveling roads to make them usable during the winter months. Here the liability of plaintiff is assumed. The claim is for 11,800 sq. yd. of gravel, requiring 980 cu. yd. of gravel delivered and spread at $2.15 per cu. yd."

Test for Depletion

The higher court recently held that Congress has sole authority to specify allowable depletion for stone and mineral products.

For illustration, in *United States* v. *Wagner Quarries Company*, 260 Fed. Rep. (2d) 907, the suit involved this legal question:

Is the Commissioner of Internal Revenue required to allow the Wagner Quarries Company a depletion allowance of 15 percent on limestone?

During the trial the testimony showed that, in the Federal Statutes, Congress has classified mineral deposits by expressive terms, giving to each of the respective types of products a fixed depletion: 15, 10, and 5 percent. For "metallurgical grade limestone, chemical grade limestone," the Wagner Quarries Company was entitled to 15 percent depletion allowance.

The higher court held that the quarry company was entitled to 15 percent depletion allowance, and said:

"In determining whether the taxpayer's (Wagner Quarries Company's) limestone was entitled to depletion allowance of 15 percent for income and excess profits tax purposes, on the ground that it was 'metallurgical grade limestone, chemical grade limestone,' the test was not what various purposes the limestone might be used for, but rather whether it qualified for chemical or metallurgical purposes."

The court went on to explain that a reasonable interpretation of congressional intent in using the words "metallurgical grade limestone, chemical grade limestone" would mean a limestone of high carbonate content with a very low silica or impurities percentage, capable of use for metallurgical or chemical purposes.

$40,000 Damages

According to a late higher court decision, the allowance of $40,000 damages for the death of a farmer is not excessive.

For instance, in *Rismiller* v. *The Day Company*, 129 N. E. (2d) 395, it was shown that an employee of a company tied a guy wire to the corner post of a fence situated on the lands owned by one Rismiller. The guy wire was charged with approximately 7,000 volts of electricity when it came in contact with a high voltage wire. Later Rismiller was killed when he attempted to unfasten the guy wire from his fence post.

In subsequent litigation, the higher court held the company liable to Rismiller's dependents for $40,000 in damages, and said:

"There is no proper showing that the amount of the verdict was ex-

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. . . THE 24-HOUR PUMP
Reasons for the world-wide success of FLYGT B-80L pumps:
Electric, fully submersible, fully portable (185 lbs)
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Runs dry without damage
Takes high proportion of solids
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6 hp, 3" hose, 330 GPM, max. head 170 ft.
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Higher heads with FLYGT pumps in tandem.
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Stone quarry owner rates Chevrolet best at saving money

"My '59 Chevies move more material at less cost than any other make I've had."

—R. G. SNYDER,
SNYDER STONE QUARRY,
MARTINSVILLE, VIRGINIA

"Put a Chevrolet out on the job and it'll stay there. Upkeep costs are at a low minimum. You never do wear one out; you just get tired of looking at it and buy a new one.

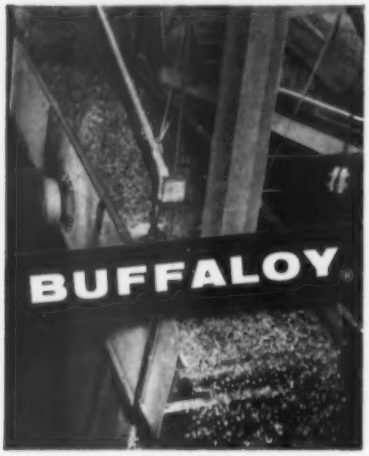
"I move material at less cost per mile with this '59 Chevrolet than any other make of truck I've ever had. And it'll move over the road with a full load as fast as a light truck. Chevrolet trucks get better and better every year. I've never seen a more dependable truck than this '59. Keeps going and going with no downtime at all for major service work."

Chevy, you'll find, is winning a lot of new boosters among mining and quarry men, for a number of good reasons. Reasons like money-saving *power*, for instance. Chevrolet for '59 offers newly improved valve-in-head 6's that nurse a gallon of gas like nothing in trucks has before. Or big V8's for every Series that include the shortest stroke design—the best saving design—in the field. And for the *toughness* that leads to low maintenance, Chevy's advanced chassis components are specially designed for the capacity to out-muscle the roughest kind of runs. For the *latest* in low-cost hauling equipment, see your Chevy dealer! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET

No job's too tough for a Chevrolet truck!

SURE WAY TO CUT
SCREENING COSTS



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Long experienced in serving the mineral aggregates industry, Buffalo Wire Works possesses the necessary skills to produce a wide selection of weaves and mesh sizes, with virtually any type of edging, for meeting your needs precisely.

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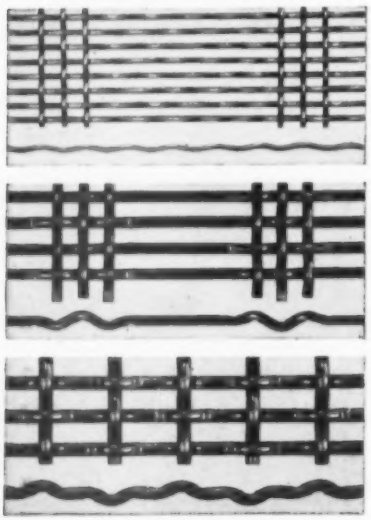

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cessive, or given under the influence of passion and prejudice."

Property Owner Was Paid Previously

All legal experts agree that if a sand and gravel or other business is depreciated when the state highway department blocks off a driveway leading from the dealer's business to the highway, the state is liable in damages. On the other hand, if the dealer accepts money from a county or state for a right-of-way, easement, or deed, he cannot later complain that his business is affected or depreciated or damaged.

For example, in *Meyer* v. *Jefferson County,* 305 S. W. (2d) 536, a dealer named Meyer sued the county and the department of highways for $25,000 damages alleged to have been done to his real estate when the county closed a county road and raised the grade level of the highway adjacent to his property,—thus interferring with ingress and egress to his place of business.

During the trial testimony was given to the effect that Meyer had previously accepted $7,600 from the highway department for a right-of-way and easement for the construction of the highway according to plans and specifications on file in the office of highway department.

The higher court refused to award any further damages, saying:

"Appellant's (Meyer's) deed to the Department clearly estopped him from making any claim for such damages."

Not Subject to County Zoning Law

A few weeks ago a higher court rendered an important decision to the effect that a city or county ordinance is invalid and unenforceable with respect to a state.

For illustration, in *Davidson County* v. *Harmon Construction Company,* 292 S. W. (2d) 777, it was shown that a county attempted to enforce its zoning ordinance against the state, which was constructing a building. It was alleged that the building, because of its height, would be a menace to the municipal airport.

The higher court held that this state-owned property, on which the state is going to build a public building for governmental purposes, is not subject to the county zoning ordinance. The court said:

"The state is not subject to the zoning ordinance or building code of a city or county."

See further the leading case of *City of Charleston* v. *Southeastern Construction Company,* 134 W. Va. 666. In this case the higher court cited cases from two other jurisdictions, as follows: In *Education of Blind* v. *City of Louisville,* 128 Ky. 767; and 8 L.R.A., N.S., 553.

Must Follow Law

Modern higher courts consistently hold that an injured employee cannot recover compensation for an injury unless he complies with all details of valid state laws. Last month a higher court held that this same rule of law is effective with respect to an appeal from a decision made by an official under the State Workmen's Compensation Act.

For illustration, in *Moore* v. *General Motors Corporation,* 154 N. E. (2d) 467, the testimony showed that an employee named Moore was seriously injured while performing his regular and usual work. The administrator of the Bureau of Workmen's Compensation disallowed the claim. Then Moore appealed to the Court of Common Pleas.

However, no state law clearly gives authority to this court to review and decide a compensation case appealed by an injured employee from a decision rendered by the administrator of the Bureau of Workmen's Compensation. Therefore, the higher court held that the Court of Common Pleas could not decide the case, saying:

"It is fundamental, of course, that the primary rule in the construction and interpretation of statutes is to arrive at the intenion of the legislature. We think it clear that the legislature had no such intent."

ROB ROY CERNEY has been named plant manager at the Superior, Nebr., plant of Ideal Cement Company, having served as assistant plant manager at Portland, Oreg. He replaces ROBERT E. MARSH, who has been transferred to the Mobile, Ala., plant as manager. Mr. Marsh replaces HUGH CONNER, who resigned.

Industry Personalities

WILLIAM D. DICKINSON has been elected vice-president of the Calcium Chloride Institute. He had been chief engineer of the Institute since 1955, and will continue in that post as well.

WARREN E. BROWN has recently been named plant manager for the Portland, Colo., plant of the Ideal Cement Company. He was previously plant manager at San Juan Bautista, Calif.

L. C. Hamilton

J. C. Hoffman

Appointment of two general sales managers for Huron Portland Cement Company was announced recently. LEE C. HAMILTON becomes general manager of contract sales, and JOHN C. HOFFMAN, general manager of commercial sales.

Mr. Hamilton started in the traffic and order department of Huron Portland Cement in 1946. He became assistant general sales manager three years ago.

Mr. Hoffman, a 28-year veteran of Huron Portland Cement, started in the sales department, later became credit manager, and finally assistant to the vice-president in charge of sales.

JACK C. RUSSELL has been promoted to the position of supervisor of safety and employee welfare at the Columbia Cement Division of Columbia-Southern Chemical Corporation, Zanesville, Ohio.

Any conveyor system, whether in a revolutionary oil plant in Colorado or an unloading dock in Brooklyn, has flexibility to meet future needs with these Hewitt-Robins pre-engineered, jig-fabricated sectional units. Designed for a wide range of applications, they find use in sand, gravel, coal, stone, ore, grain, and many other installations. Interchangeability of components, standard design for 2HP and up, capacities up to 1000 TPH at speeds as high as 650 FPM, standard widths of 18", 24", 30", 36", or 42", and easy assembly by your own personnel mean substantial savings of time and money.

Full complements of Hewitt-Robins standard products, including conveyor belting, convenient one-shot lubrication idlers, and standard accessory items are available from stock. Detailed estimates can be made promptly for your individual requirements; economical modifications can be developed quickly by H-R Rock Products Engineering specialists. Hewitt-Robins also builds special conveyor systems capable of handling up to 6000 TPH at speeds up to 850 FPM. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 8-24.

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CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

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"Our blasting days are over.
INTERNATIONAL
DIESEL

. . . with the TD-24"

—Wrightwood White Rock Co.,

Wrightwood, California

"With the International TD-24 our need for explosives to shatter rock is eliminated," declares Owner Dale Douce, Wrightwood White Rock Co. "The '24' can do a better job than dynamite at a fraction of the cost."

The TD-24 removes a 40-foot overburden from the 1,000-foot-thick deposit—rips the rock into fragments, dozes it down to the loading level.

It's typical of the tough rock jobs which so many miners and quarrymen are doing to best advantage with Planet Power-steered TD-24's—against any other method or machine!

How TD-24's double for dynamite Sometimes it even takes two king-sized, clutch-steered crawlers to equal one Planet Power-steered TD-24 on rough, tough rock-moving. Exclusive, years-proved Planet Power steering gives your operator full-time "live" power on both TD-24 tracks—full-time separate and positive control of each track! And full-time, on-the-go Hi-Lo (up or down!) power-shifting.

Load-limiting and load-spilling "dead-track drag" is eliminated, because Planet Power steering keeps the full payload on the move even on turns. Gives bonus-load follow-through when ripping or dozing rock. Equalizes track speed for full-bite benching!

Prove the amazing production increase Planet Power-steered TD-24's can give and keep giving you—"blasting" through rock or other tough materials—or on everyday overburden removal. Compare TD-24 undercarriage strength—long, heavy-duty track-roller life and maintenance ease—precision sealing of parts—to anything else on tracks! See your International Construction Equipment Distributor for a demonstration!

"I always feel confident in the big TD-24, even working on the edge of benches with a sheer 100-foot drop," reports Operator Lloyd Medlock. "Positive steering control, good brakes and excellent balance make the TD-24 a *safe* tractor even in hazardous work like ours."

This quarry produces an exceptionally white, high-calcium (98%) limestone—widely used for roof-covering in the Los Angeles area; also by glass and chemical manufacturers. Note the rock-shattering job being done by the TD-24-powered Ateco ripper!

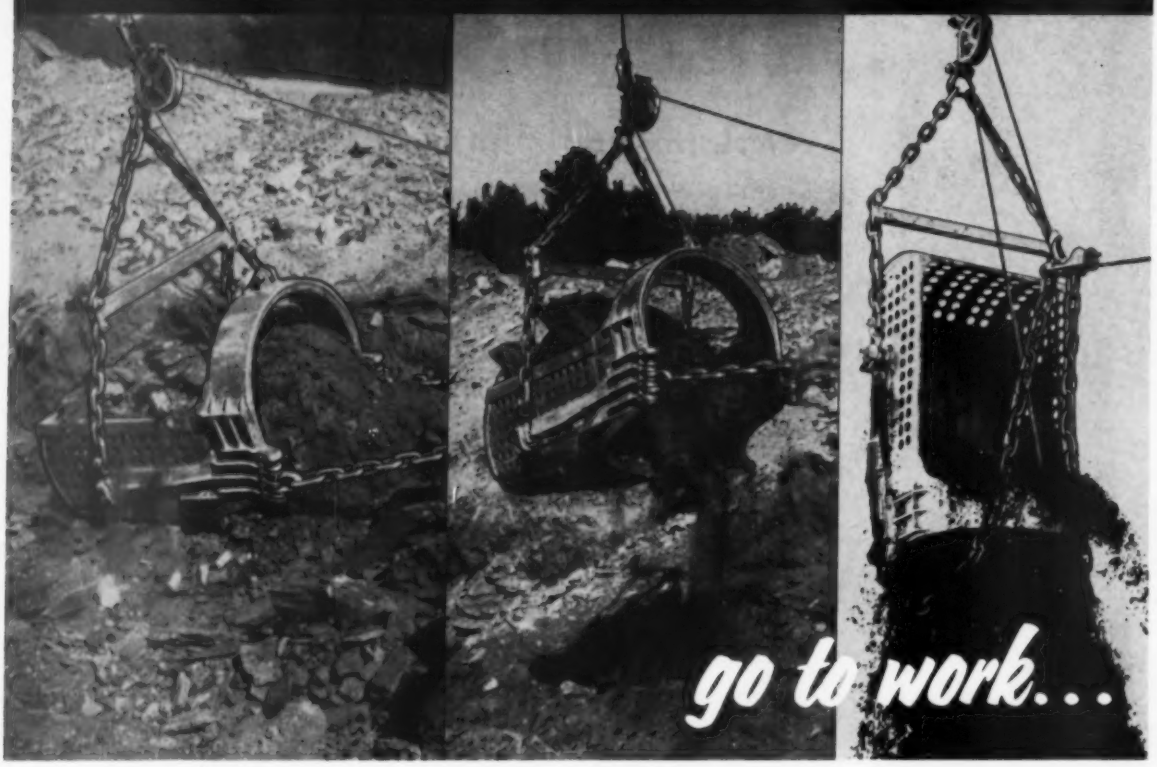
International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Enter 130 on card, page 145

HENDRIX DRAGLINE BUCKETS

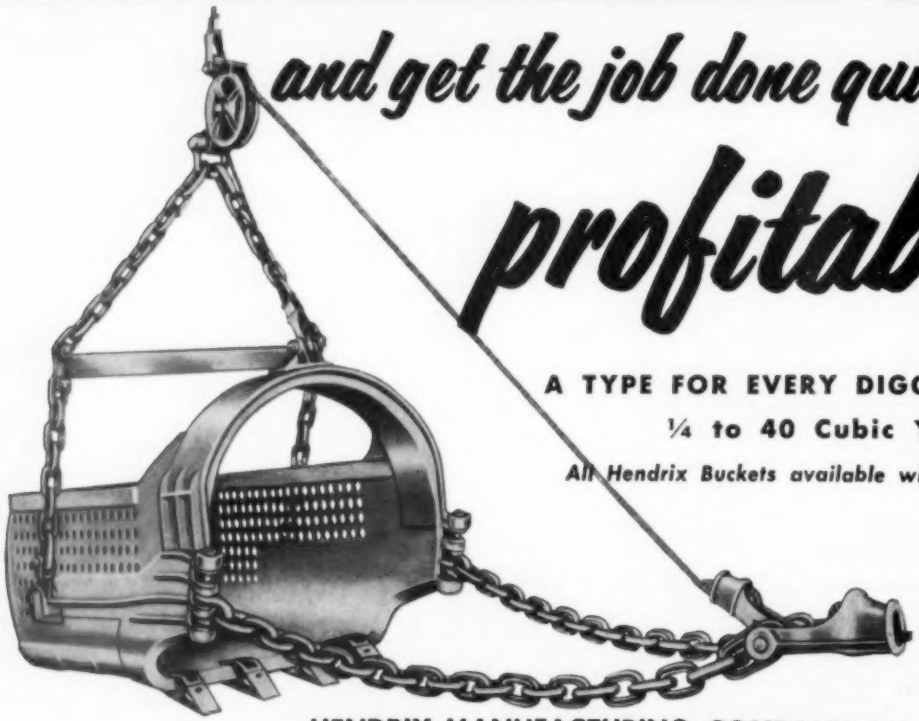


and get the job done quickly and profitably!

A TYPE FOR EVERY DIGGING PURPOSE

¼ to 40 Cubic Yards

All Hendrix Buckets available without perforations



Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING COMPANY, Inc.

MANSFIELD, LOUISIANA

Announcing **WORLD'S TOUGHEST OFF-ROAD TIRE!**

All-New Nylon U. S. Royal Super Con-Trak-Tor with ...69% to 95% Longer Tire Life!

S.R.T.*

Steel Reinforced Tread*

New S.R.T.—as shown here in the X-Ray photo—is a **tough** reinforcement of tread, shoulder and buttress areas. It consists of several thick layers of tread rubber containing thousands of short lengths of brass-coated steel filaments. This forms a virtually **impenetrable** mat between the tread and nylon cord body and extends down through the shoulder and buttress areas providing **positive** protection against combination cut-and-impact failures!

Add to exclusive Steel Reinforced Tread... 50% deeper tread at center... far deeper tread at shoulder... 25% more ground contact... Double-Strength Nylon and you have the world's **toughest** off-road tire! No wonder the great new U. S. Royal Super Con-Trak-Tor-S.R.T. outperformed **every** tire put against it—by the widest of margins—up to 95%! Can you afford less on **your** jobs?

U.S. ROYAL SAFETY 1ST TRUCK TIRES

US RUBBER **United States Rubber**

ROCKEFELLER CENTER, NEW YORK 20, N. Y.

G-C

QUALITY LUBRICANTS for Pits and Quarries

ROCK DRILL OIL No. 920 and 940

A superior Rock Drill lubricant which guarantees longer life to equipment. Film strength shows no rupture at 300,000 psi.

◆

BEN BOY Coupling Lubricant

Recognized as the finest coupling lubricant on the market today.

◆

BEN BOY Multi-purpose and High Heat Lubricant

Lubricates at all temperatures up to 500°F. Won't melt or run. For all types of ball and roller bearings. Adheres to metal at both low and high temperatures. Outlasts ordinary lubricants TWO to FOUR times. Satisfaction guaranteed.

◆

YUKOL EP Gear Lubricant

For all enclosed gears. Exceeds Mil-L-2105 specifications. Passes Timken 68 lb. load test. 36% more load value.

◆

WHITE STAR Compressor Oil

For all compressors. Excellent water separation. High film strength. Low carbon content. Contains no viscosity index improvers.

Wire, Write or call

GEORGIA-CAROLINA OIL COMPANY
P. O. Box 101 Phone SH 2-1428
MACON, GEORGIA

Enter 134 on card, page 145

Manufacturers' News

Chase Bag Company, New York, N. Y., has appointed THOMAS A. EADON JR. sales manager of its New York sales department. Mr. Eadon has been connected with the firm's Philadelphia branch since 1948, where he was named sales manager in 1956.

E. M. WOODRICH, who has been associated with Chase's Philadelphia branch as a sales representative in the Baltimore area, will succeed Mr. Eadon as sales manager in Philadelphia. He has been with Chase since 1953.

Wemco, a division of the Western Machinery Company, San Francisco, Calif., has named five additional distributors to handle its line of aggregate processing equipment.

The Seitz Machinery Company of Billings and Great Falls, Mont., will serve Montana, except the six northwest counties. The state of Kansas except the Kansas City Market area will be served by the White Star Machinery & Supply Company, Inc., of Wichita.

Parker-Danner Company, Hyde Park, Mass., will distribute in the states of Maine, Vermont, New Hampshire, Rhode Island, and Massachusetts. Southern Machinery & Supply Company, Roanoke, has Virginia; and the Mitchell Distributing Company, Charlotte, N. C., will distribute Wemco products throughout North Carolina.

The Georgia-Carolina Oil Company, Macon, Ga., has completed 40 years of service to the pit and quarry, construction, and allied industries. Selling nationally and in some foreign countries, Georgia-Carolina Oil specializes in lubricants for the heavy machinery of these industries, maintaining fifteen field service representatives for consultation on correct lubricants.

Ralph W. Jones, founder of the company, is president, and Holt E. Coggin is sales manager.

The J. B. Ehrsam & Sons Manufacturing Company, Enterprise, Kans., has announced the appointment of JOHN J. MCGLONE as sales manager. He formerly was vice-president of the Wellman Engineering Company, Cleveland Ohio.

J. J. McGlone

D. Hetrick

Appointment of DEL HETRICK as tractor equipment sales manager has been announced by Gar Wood Industries, Inc., Wayne, Mich. With Gar Wood since 1947, his previous position was as assistant sales manager, tractor equipment.

O'Leary's Contractors Equipment & Supply, Incorporated, Chicago, Ill., has been named by the Oliver Corporation, Chicago, as distributor of its industrial products in the Chicago area.

H. E. SMITH and LEON D. SMITH have been appointed sales representatives for Leschen Wire Rope Division, H. K. Porter Company, Inc.

H. E. Smith will headquarter at Nashville, Tenn., with a territory that includes most of Kentucky and Tennessee, Alabama, and western Florida. He brings to Leschen ten years of experience with distributors of heavy construction equipment.

Leon Smith's territory covers Virginia and West Virginia, with headquarters at Richmond. He replaces THOMAS TURNER, who has been promoted to the newly-created position of assistant to the general manager.

Enter 135 on card, page 145 →

Rehandling aggregates: American 700 Series Clamshell

Bigger Bite, Longer Reach: American 700 Series Shovel

PROFIT BY THE EXPERIENCE OF OTHER AMERICAN CRANE OWNERS!

Owners and operators of American cranes and excavators can depend on "years-ahead" engineering features to insure them of fast, efficient digging and rehandling operations. Their acceptance of American dependability and versatility is just one more reason why you'll see American equipment in use by more and more of the nation's top pit and quarry operations.

If you have expensive, single-duty equipment standing idle in your yard, now is the time you should fully examine the potential of multi-purpose American cranes. They can cover a wider variety of jobs than almost any other machine you own. Handling loads of all shapes and types, American cranes are tailor made for almost every job in your pit or quarry. With interchangeable fronts . . . hooks, grapple, clamshell, dragline or shovel . . . the demands of your operations can be met by a complete line of American Cranes. Based on the experience of other American owners and operators, Americans are job tested . . . job proven . . . job ready . . . to help cut your costs.

Get the complete story on the American best suited for your needs. SEND FOR FREE detailed and illustrated catalog information on American Cranes and excavators.

Deep Down Digging: American 300 Series Dragline

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

DERRICKS-HOISTS to 800 tons REVOLVER CRANES to 400 tons	EXCAVATORS-CRANES to 2 yds.-60 tons LOCOMOTIVE CRANES to 130 tons	AMERICAN HOIST PACIFIC COMPANY Special materials handling equipment	CROSBY-LAUGHLIN DIVISION Drop forged fittings for wire rope-chain

AMERICAN HOIST AND DERRICK CO.
Dept. PQ, St. Paul, Minnesota

Please send me FREE complete catalog information on American cranes and excavators.

☐ Truck ☐ Self-propelled ☐ Crawler ☐ Pedestal

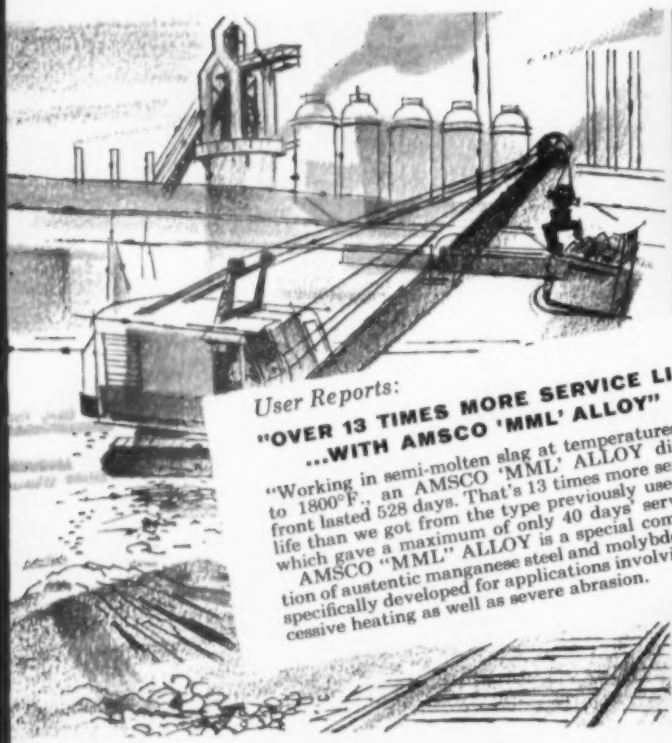
Name_____

Firm_____

Address_____

City_____ State_____

How AMSCO helps you MOVE



User Reports:

"OVER 13 TIMES MORE SERVICE LIFE ...WITH AMSCO 'MML' ALLOY"

"Working in semi-molten slag at temperatures up to 1800°F., an AMSCO 'MML' ALLOY dipper front lasted 528 days. That's 13 times more service life than we got from the type previously used . . .; which gave a maximum of only 40 days' service." AMSCO "MML" ALLOY is a special combination of austentic manganese steel and molybdenum, specifically developed for applications involving excessive heating as well as severe abrasion.

User Reports:

"AMSCO SIMPLEX TOOTH GIVES 18 WEEKS EXTRA SERVICE"

"We're getting between 15 and 18 weeks extra service by using AMSCO Simplex dipper teeth", reports Mr. Fred Weber, Jr., Vice-President of Vigus Quarries, St. Louis, Missouri. "This gives us almost 4 times the service life we've been getting from standard teeth in our rugged limestone quarrying operation."

Mr. Weber also found that 2-part, reversible Simplex dipper teeth were so much easier and quicker to replace that his shovels were back on the job in no time.

MORE TONS PER DOLLAR

For rugged digging, crushing, pumping, or rebuilding jobs... it pays to ASK for AMSCO!

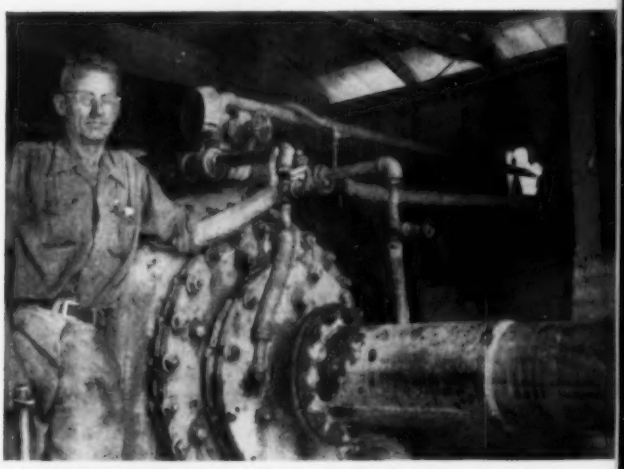
AMSCO's sole job is to help you fight wear caused by impact and abrasion. AMSCO Manganese Steel—"the toughest steel known"— is today's number one choice for long-lasting dippers, dipper parts, crushers, tractor parts.

AMSCO Alloys, developed to meet unusual wear problems, add extra service life under special and very severe operating conditions.

AMSCO Hardfacing Materials permit economical build-up or repair of worn parts—at a fraction of the cost of new parts. Use this specialized know-how and broad line of "wear-fighting" products to help *your* equipment move more tons per dollar. Ask for AMSCO!

NOW...WELD MANGANESE AS EASILY AS MILD STEEL

"We're getting just the kind of welds and build-up we want with good cost saving to boot," says a user of Nicro•Mang rod. From all over, in a variety of hardfacing applications, reports of success with AMSCO NICRO•MANG are coming in. Users like the stable arc, and wide range of arc length . . . the non-popping, the easy removal of slag . . . and above all the fast build-up. For high strength, superior crack resistance, and easy welding, Nicro•Mang is unbeatable for fabrication and build-up of manganese steel.



"29 YEARS WITH THE SAME 8" AMSCO PUMP"

Haskell Peel, Plant Superintendent at Consolidated Gravel Company, Columbus, Georgia, has shared many experiences with his 8" AMSCO PUMP. One of his favorites is the time that he and his pump almost dried out a lake to recover a sunken dredge. He hooked the 8" AMSCO to more than 1,000 ft. of 10" pipe, and ran it continuously for three days. No wonder the pump is his pet . . . it's been doing the job, pumping 75% sand and 25% gravel, for more than 29 years.

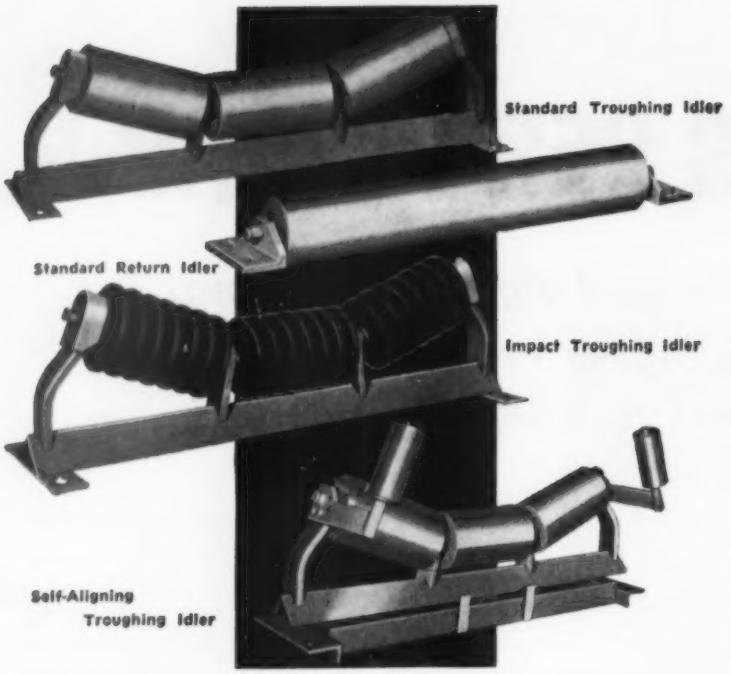
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other Plants in: Denver • Los Angeles • New Castle, Dels. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed by Canadian Liquid Air Co., Ltd.

Enter 136 on card, page 145



MARCO belt conveyor idlers

INCREASE PROFITS BY HANDLING GREATER LOADS AT LOWEST COSTS...

The advanced engineering ideas incorporated in MARCO conveyor idlers will increase your production and lower your material handling costs.

For example, MARCO idlers have greater load capacity because they are designed with precision ground ball bearings, designed specifically for conveyor idlers. At 300 revolutions per minute, they will carry loads up to 860 lbs. per bearing. These anti-friction bearings give you added years of idler service life and lower power requirements.

Less maintenance: Pre-lubricated, effectively sealed bearings eliminate field lubrication. Self-shedding base keeps material build-up at a minimum. End and center brackets are ½" thick steel, die formed, to eliminate breakage.

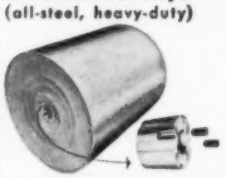
Why settle for anything less than the proven economy and efficiency offered by MARCO idlers? Units fit any conveyor frame and are available in many types and sizes. **Ask for bulletin ID-2.**

MARCO — One source for all your Conveyor Needs

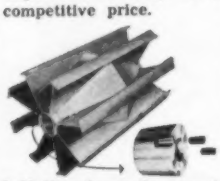
Whether you need a complete conveyor, or any conveyor accessory, there is a MARCO product to meet your exact requirements. By relying on MARCO —you save time, trouble and get more for your dollar.

Get the facts from your MARCO distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

Solid Steel Pulleys
(all-steel, heavy-duty)



All MARCO pulleys offer the outstanding advantages of machined faces and Taper-Lock bushings—at a competitive price.



Self-Cleaning (wing-type) Conveyor Pulleys
(Steel fabricated, jig welded)

Pulley pays for itself many times in longer belt life by discharging 'mis-located' particles before belt can be damaged.

MARCO

*Trademark Reg.

engineered MARCO products:

Tubular Frame Belt Conveyors—Conveyor Idlers—Solid Steel and Self-Cleaning Steel Pulleys—Bucket Elevators—Control Gates—Feeders—Bins.

Enter 138 on card, page 145

Baughman Manufacturing Co., Inc., Jerseyville, Ill., has announced the appointment of Myrick Equipment Company as distributor for Baughman bulk feed bodies in the state of Mississippi.

B. N. MYRICK will personally represent the new distributorship, traveling throughout Mississippi. At a later date, he will establish a centrally-located permanent office in the state.

Myrick Equipment Co. now serves as Baughman's distributor in five states. The Myrick firm's home office is located in Mt. Pulaski, Ill.

The Durkee-Atwood Company, Minneapolis, Minn., manufacturer of automotive fan belts and of V-belts, has elected CARTER B. HALEY as vice-president in charge of Industrial Division sales.

Mr. Haley has been associated with the firm for nine years, and has been for some time sales manager of the Industrial Division.

Lukens Steel Company, Coatsville, Pa., has announced the completion of the greatest single expansion program in its 149-year history.

At a total cost of $33,000,000, the company has increased its steelmaking capacity by 24 percent (to 930,000 ingot tons annually) and raised its plate-rolling facilities by some 40 percent. Lukens reports it is now the third largest producer of steel plate in the nation.

JOHN SLY has been named assistant sales manager of the Industrial Products Division of The Dayton Rubber Company, Dayton, Ohio.

JOSEPH B. MAXON succeeds Mr. Sly as regional manager of the central region with headquarters in Dayton.

Atlas Copco, New York, N. Y., has established a new subsidiary to supply compressors and air-powered tools for mining, construction, and general industrial work in Portugal.

The new firm, Atlas Copco de Portugal, Ltda. of Lisbon, will be directed by Bo Englund, former managing director of Atlas Copco companies in Turkey and Belgium.

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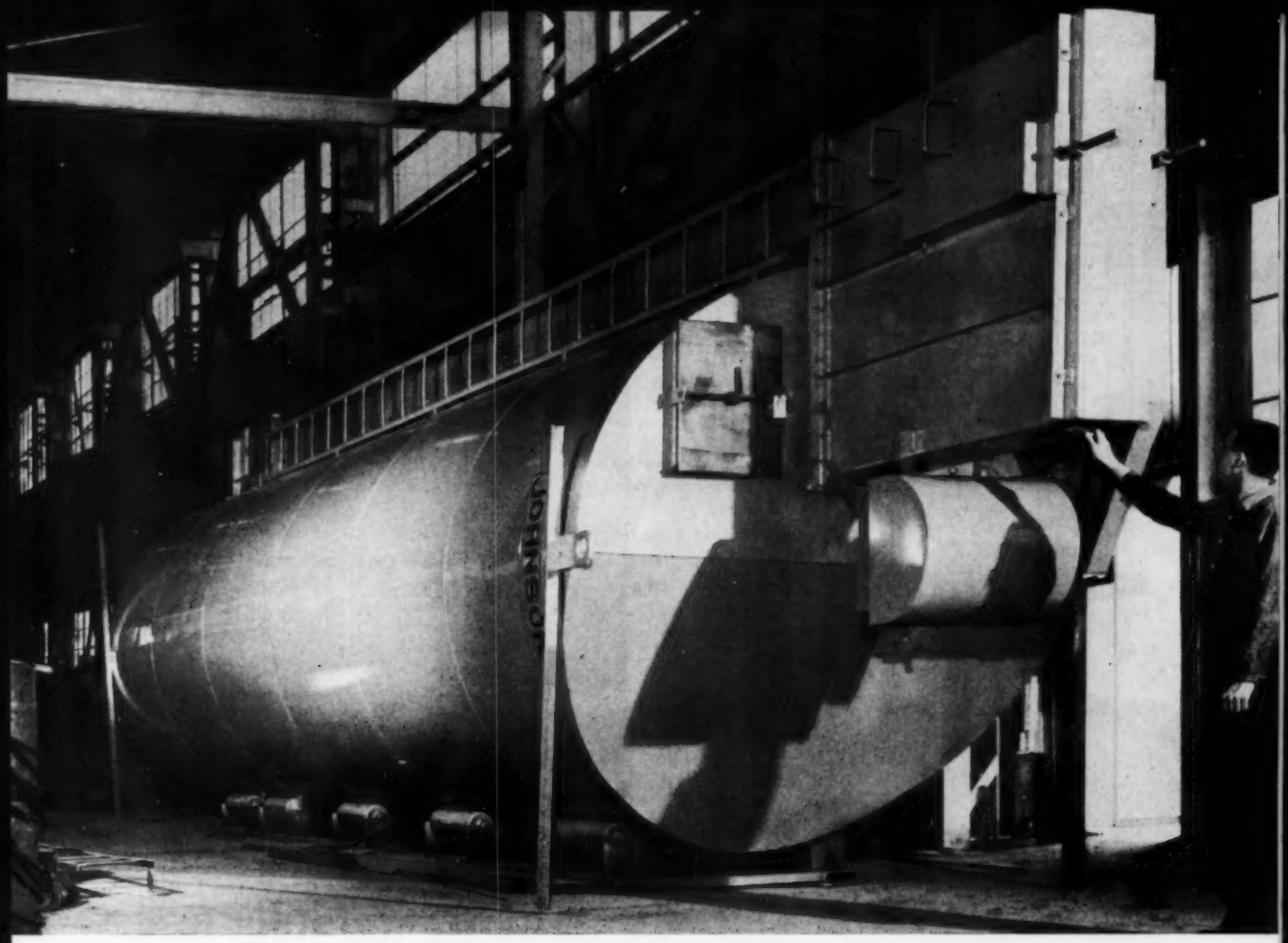


The cement is heavy, but the silo isn't!

USS MAN-TEN Steel chops weight 25%

The C. S. Johnson Company of Champaign, Illinois is one of the world's largest manufacturers of concrete batching and cement handling equipment. And they depend on USS MAN-TEN High-Strength Steel to help satisfy their customers.

In the side wall construction of cement storage silos, for example, lightweight construction with MAN-TEN Steel permits faster, easier erection and a big savings in freight transportation.

The unit needs less maintenance because USS MAN-TEN Steel has good resistance to abrasion, impact, fatigue and atmospheric corrosion. On-the-job life expectancy is as high as *20 years* for the equipment fabricated with MAN-TEN Steel.

MAN-TEN Steel is also used by C. S. Johnson for concrete buckets, clamshell buckets and elevator casings, with higher strength and lower weight the inevitable result.

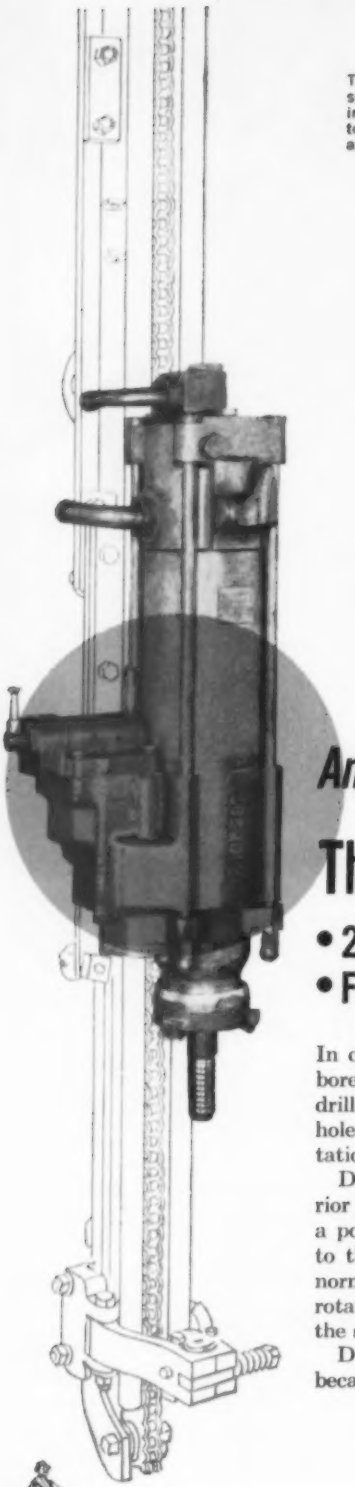
No matter what performance you need from a High-Strength Steel, there is one that will do the job. United States Steel has three brands of High-Strength Steel—USS MAN-TEN, COR-TEN, TRI-TEN and the remarkable USS "T-1" Constructional Alloy Steel—each with its own characteristics. For complete technical information on any of these steels, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, MAN-TEN, COR-TEN, TRI-TEN and "T-1" are registered trademarks

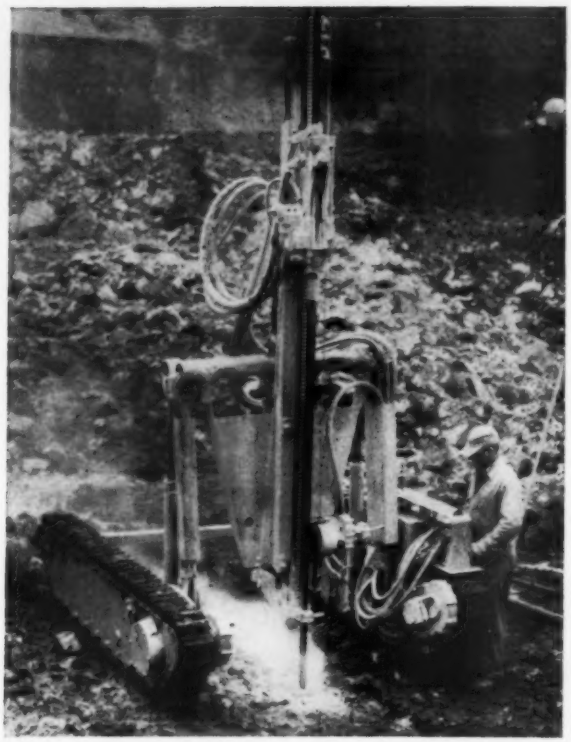
USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



The 450-DR is available on several self-propelled carriers, including the completely automatic TDM Trac-Drill shown at the right.



Another Joy First

The 450 DUAL Rotation Drill

- **25% Higher Drilling Speeds**
- **Faster Steel Changes**

In competitive demonstrations of 4½" bore drills, the new Joy 450-DR not only drilled faster, but also finished blastholes which the conventional reverse rotation machines could not bottom.*

Dual Rotation, which made this superior performance possible, is provided by a powerful vane-type air motor geared to the chuck. It provides a booster to normal drilling rotation, and gives extra rotation power while actually reducing the strain on the rifle bar.

Dual Rotation will also cut your costs because (1) there is no hammering action while coupling or uncoupling—drill steel threads, couplings and striking bars last longer; (2) all four pawls in the 450-DR are used only for forward rotation, not two for drilling and two for reversing—excessive pawl wear is eliminated; and (3) with Dual Rotation, reversing is not rifle bar actuated, therefore rifle nuts cannot back off—less downtime.

Let us prove the superiority of the new Joy 450-DR Drill. Your nearest Joy Office or Distributor will be glad to arrange a demonstration of this remarkable new drill.

C 7077-316

*Competitive test results available upon request.

JOY CONSTRUCTION EQUIPMENT IS SOLD AND SERVICED BY THE JOY DISTRIBUTOR IN YOUR AREA

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Portable Compressors	Trac Drills	Tungsten Carbide Rock Bits	Hand-Held Rock Drills

CLEARS ENTIRE BLAST AREA IN MINUTES!

TROJAN
YALE & TOWNE

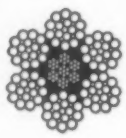
Trojan 404 Handles Shot Rock on Busy State Road — Keeps Traffic on the Move

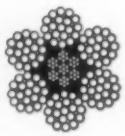
After each blast, move in fast — clear area — move out — keep traffic moving . . . The big 4 yard Trojan 404 is right at home when confronted with such a tight operating pattern . . . Working speed, along with strength and ability to handle heavy, heaped loads of shot rock, established the Trojan 404 as the most valuable piece of equipment on the job . . . The main objective was accomplished — no traffic tie-ups! This is another example of Trojan's proven job performance under exacting operating conditions . . . Ask your local distributor to demonstrate Trojan job ability.

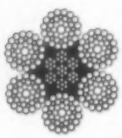
TROJAN DIVISION, THE YALE & TOWNE MANUFACTURING COMPANY • BATAVIA, N. Y.; SAN LEANDRO, CALIF.

YOU CAN'T BARGAIN WITH SAFETY

WICKWIRE ROPES FOR THE QUARRYING INDUSTRY


6 x 21
Filler Wire, IWRC


6 x 25
Filler Wire, IWRC


6 x 41
Filler Wire, IWRC

6 x 19
Seale, IWRC

For detailed recommendations, write the nearest CF&I sales office, and ask for WR 737.

For safety and performance
. . . order CF&I-WICKWIRE
"job-designed" wire ropes

The Image of CF&I—a giant steelman—stands for the rigid quality-controls and testing procedures that are carried out in the production of Wickwire Rope. This Image also reflects CF&I's ability to design a specific product to meet a particular need.

These are the very reasons why CF&I-Wickwire Ropes are both *safe*—as only a *quality* wire rope can be—and *suitable*—because they are available in a *complete range* of wire grades, types, sizes and constructions, designed to meet each industry's requirements.

Avoid the losses—due to injuries and wrecked equipment—that can occur when a "bargain" rope fails. Buy a quality wire rope that's designed for the job it must do—a CF&I-Wickwire Rope.

WICKWIRE ROPE
THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver El Paso • Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia

6794

27 ton

"EUC" REAR-DUMP

It's new...but JOB PROVED!

Torqmatic Drive . . . 18.00 x 25 tires

Model R-27 is a new size in the complete line of Euclid Rear-Dumps—rated payload is 54,000 lbs. This off-highway hauler incorporates the job-proved components which have made Euclid Rear-Dumps the outstanding choice of contractors, mines and quarries.

With either 335 h.p. Cummins or 336 h.p. GM diesel engine, the Allison Torqmatic Drive makes maximum use of the power for faster hauling cycles. Converter lock-up in the 4-speed Torqmatic permits 34 mph speed with full payload and efficient performance on long, high speed hauls.

Standard 18.00 x 25 tires on all four wheels assure the traction and load carrying capacity needed for moving 27-ton payloads on tough hauls. Standard body is rated at 18 cu. yds. struck —quarry type body is also available. The R-27 is equipped with oil retarder for safer, more economical braking on jobs with steep down-grades on the loaded haul.

See your Euclid dealer for detailed specifications on this new 27-ton Rear-Dump . . . it's a good example of the advanced design that makes Euclid your best equipment investment.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

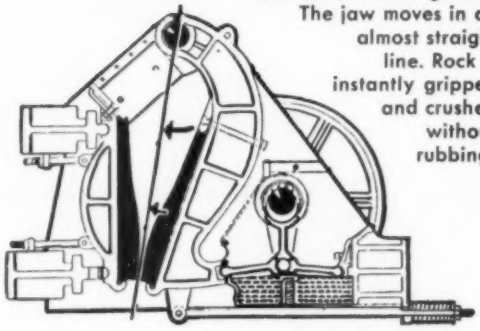
EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Jaw plates last at least 5 times longer with KUE-KEN®... the hard rock crusher for lowest cost-per-ton crushing

Hard rock crushing calls for Kue-Ken Crusher. Rubbing, the main cause of premature jaw plate wear in conventional crushers, is eliminated in Kue-Ken by "crushing without rubbing" . . . the patented principle that ends costly, periodic downtime and premature parts replacement. In Kue-Ken, power consumption is far less. By gripping rock firmly and crushing squarely, Kue-Ken applies its power to crushing rock, not wearing out jaw plates. Kue-Ken mechanism operates in a sealed, dust-tight crankcase lubricated by filtered oil. This permits higher speeds for greater capacity allowing for a smaller, lower cost crusher. Automatic flywheel release prevents breakage from tramp iron. Kue-Ken crushers are available in sizes to meet every requirement.

See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.



KUE-KEN® CRUSHERS

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers
Revolving Screens · Classifiers · Feeders · Rib Cone Ball Mills
Concentrating Tables · Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn. Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

DEALERS:

SEATTLE, WASH. ..... Washington Machinery Co.
BUTTE, MONTANA ..... Hall-Perry Machinery Co.
VANCOUVER, B. C. ..... Universal Equipment Co.
SALT LAKE CITY, UTAH ..... Lund Machinery Co.
SAN ANTONIO, TEX. ..... Closner Equipment Co.
LOS ANGELES, CALIF. ..... Garlinghouse, Fremon Co.
SAN FRANCISCO, CALIF. .... Aggregates Engineers, Inc.
PORTLAND, OREGON ..... Air-Mac, Inc. of Oregon
BISMARCK, NORTH DAKOTA .... Midwest Equipment Co.
PHOENIX, ARIZ. ..... Road Machinery Co.

More Information, Please

Use postcard to receive literature or details on new equipment and products reported in this issue.

BASIC DATA FOR THE SELECTION OF WORM GEAR SETS is provided in a catalog published by the *De Laval Steam Turbine Company*. The fully illustrated catalog contains basic information on the company's Delroyd worm gearing, as well as selection data, design data, and information on the special features of worm gearing, how to select it, and how to calculate bearing loads. **(301)**

HAULPAK OFF-HIGHWAY TRUCKS are detailed in a 24-page brochure issued by *LaTourneau-Westinghouse Company*. Profusely illustrated, the catalog points out the design and operational features of the new line, detailing such items as Hydrair (air-hydraulic) suspension, high capacity "V" frame and body, multiple braking system, earthmover type final drives, aerodynamic "power-miser" fan, and sealed for life bearing system. **(302)**

DURASHEATH BUTYL POWER CABLE, manufactured by the *Anaconda Wire & Cable Company*, is covered in a catalog containing information on design features, insulations available, and performance highlights. Also included are data on kinds of available constructions, from 600-v. to 15,000-v. conductors. Ampacity and installation data are provided. **(303)**

"CONVEYOR AND ELEVATOR BELTS," a 4-page brochure prepared by the *Home Rubber Company*, provides specifications and applications for Home's four brands of rubber belting. Weight computation of the belting is explained and specifications and recommended applications for the company's World, Faultless, White Cross, and Black Seal belting are included. **(304)**

THE AMSCO SEMI-AUTOMATIC WELDER for build-up and hardfacing is described and illustrated in a folder published by the *American Manganese Steel Division*. The portable welder features simple arc length control and finger tip feed of welding wire through electrode holder. **(305)**

A REVISED REFRACTORIES HANDBOOK issued by *Walsh Refractories Corporation* includes a number of new products developed since the initial edition was printed. The 130-page booklet includes additions to the company's general refractories line, including H & B Castable #28; Hi-Al (high alumina) castables; Walram plastic, high alumina refractory for high temperature installations, silica cement and zircon fire brick. **(306)**

ROPE THREAD BLAST HOLE DRILLING TOOLS are introduced by *Brunner & Lay* in a flyer announcing rope thread Rok-Bits, rope thread Carbo-Rok extension steel, couplings and striking bars. Size and type specifications are given. **(307)**

BELT CONVEYOR IDLERS AND PULLEYS manufactured by *Chain Belt Company* are described in 72-page Bulletin No. 5980. Complete information is given on Rex rated idlers, including model 1500 idlers with permanently sealed ball bearing rolls for intermediate or moderate speeds, and on a complete line of welded steel pulleys for belt conveyor, bucket elevator, and package-duty service. **(308)**

MULTI-LUBER AUTOMATIC POWER LUBRICATION SYSTEMS for trucks, trailers, and material handling equipment are covered in a new catalog published by *Lincoln Engineering Company*. Catalog No. 50 includes illustrations and specifications pertaining to air-, vacuum-, and manually-operated Multi-Luber Systems, their various applications, methods of operation, and listings of component parts and accessories. **(309)**

RADIAL DESIGN PERMANENT MAGNETIC PULLEYS are described in a catalog released by *Magnetic Engineering and Manufacturing Company*. The catalog shows how radial design is applied in protection, purification, reclamation, and separation techniques. Also featured is a selection chart, a table of pulley weights, capacities, and dimensions. **(310)**

A WELDING CARBON PRODUCTS INSTRUCTION MANUAL describing the use of rods, plate and paste is offered by *Arcair Company*. The manual is illustrated to show basic applications of these products. **(311)**

LET'S TALK TRAILERS, a new booklet produced by *Galion Allsteel Body Company*, contains helpful information on dump trailer bodies and hoists designed to aid users in choosing the correct equipment for specific on and off-tho-

August ***PIT AND QUARRY*** **1959**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS

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_____ _____ _____ _____ _____ _____

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

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More Information, Please

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highway hauling and dumping applications. Described are a variety of light, medium, and heavy-duty dump trailer bodies and hoists plus a wide selection of chassis designs, suspensions, understructures, and hydraulic mounting kits. **(312)**

EQUIPMENT, SYSTEMS, AND CONTROLS FOR THE PROCESS INDUSTRIES are featured in a bulletin announced by *B-I-F Industries, Inc.* Representative equipment from Builders-Providence, Proportioneers, and Omega divisions of the company is included: differential producers and process instrumentation; Omega feeders for controlled feeding of solids and liquids; and blenders, additive systems, and Proportioneers pumps for automatically proportioning additives, slurries, etc. **(313)**

DUST CONTROL BULLETIN 291A, issued by *American Air Filter Company, Inc.,* describes the characteristics and operation of the AMERclone dry centrifugal dust collector. Cutaway diagrams and schematic drawings illustrate the technical explanation of the unit. Sizes of AMERclones covered by the bulletin range from 3-cell units (9,000 c.f.m.) to 24-cell units (72,000 c.f.m.). A dimensions chart is included, along with an explanation of the unit's secondary air circuit and a listing of some typical AMERclone installations. **(314)**

INDUSTRIAL GASES supplied by the *Air Reduction Sales Company* are discussed in a 32-page booklet which offers a comprehensive survey of how each gas is made, delivered, and used. Gases included are oxygen, nitrogen, argon, helium, acetylene, hydrogen, carbon dioxide, and the rare gases—neon, xenon, krypton, atmospheric helium, and specially purified argon. One section of the book is devoted to the various systems for either gaseous or liquid delivery and storage. The booklet also contains a conversion data table and a table on the physical properties of the various gases. **(315)**

PROPER CARE OF DIESEL ENGINES is the theme of a new series of bulletins entitled "Defeating Dirt" just published by *Cummins Engine Company.* These bulletins give details on how to care for diesel engines to obtain maximum performance, economy, and engine life. Special tips are given on how to maintain engines to reduce down time and repair costs. The four bulletins deal with air cleaners; tubing, hose, and clamps; breathers, filler caps, and dipstick; and lube oil filters and fuel filters. **(316)**

A 32-PAGE GEARMOTOR BULLETIN has been issued by *Jones Machinery Division, Hewitt-Robins, Inc.* The bulletin contains technical information on horizontal and vertical mounted gearmotors with capacities up to 125 hp. and a variety of output speeds ranging from 780 r.p.m. to 1.2 r.p.m. Included is a load characetristics table for applications in various industries and different types of equipment, and a selection table arranged according to A.G.M.A. classifications. **(317)**

TAPER-LOCK STEEL CONVEYOR PULLEYS are the subject of a 12-page bulletin issued by *Dodge Manufacturing Corporation.* Large illustrations explain important features of these pulleys. Specifications and prices of the different sizes are listed in tables covering three pages. Complete information also is given on standard lagging and special rubber lagging. **(318)**

KILN CHAIN developed by *Campbell Chain Company* is available in three individual chain link styles which are illustrated in a flyer offered by the firm. Available in two types of material, Campbell kiln chain can be supplied to fit any chain system currently in use. Specifications are included. **(319)**

OFF-HIGHWAY TRANSPORTATION EQUIPMENT for mines, quarries, and construction is illustrated in a catalog published by the *Easton Car & Construction Company.* Pan-type trailers, drop-door trailers, dump side truck bodies, and side-dump trains are featured. Capacities are given for each model. **(320)**

MODEL M12 CONTINUOUS FEEDER BELT SCALE is detailed in a booklet released by *Thayer Scale Corporation.* The Gravitrol Scale is a troughed conveyor continuous weight belt scale, designed to deliver a uniform flow rate of material from a supply source to the process. It handles a wide range of materials for proportioning or metering applications. **(321)**

FIRST CLASS
PERMIT NO. 44
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and products _____

*U. S., U. S. Possessions, and Canada only.

Pan American countries, $10 a year; elsewhere, $15 a year.

Enter 147 on card, page 145 →

Save money on small-yardage jobs with CASE *Utility* loaders

Why tie up big, expensive equipment on small-yardage, "work-and-run" loading, stockpiling and clean-up jobs? Handle them quicker, easier, at less cost with a *budget-priced* Case *Utility* loader. Available on both tracks and rubber, Case *Utility* loaders give you more power, stamina and operating economy than any comparable-size rigs on the market. They also mount quick-change attachments for handling a wide range of pit-plant work. Have a free demonstration. Mail handy coupon today for full details.

NEW, ECONOMY

Model 210B Loader

- High-torque engine for extra dig-power
- 17° rollback heaps 11, 13, or 18-cu. ft. buckets
- Lifts 1000-lb. loads over 10' high in seconds
- 45° clean dump, 30" reach, full height
- Smooth, fast-maneuvering 4-speed transmission
- Long-lasting clutch; shuttle transmission optional
- One-piece, forged front axle; optional power-steer

Extra power, higher output is offered in 1500-lb. capacity Case 310B *Utility* wheel-mounted loader with high-torque engine and full complement of attachments.

NEW FINGERTIP STEERING
Model 310C's new total-contact controlled-differential steer cuts operator effort 60%, keeps power on both tracks at all times.
CASE

HUSKY, ALL-WEATHER

Model 310C *Utility* Crawler

- ⅝-yd. bucket quick-lifts 2600 lbs. over 9' high
- High-torque Case engine develops 5690 lbs. push-pull power
- 4300 lbs. breakaway, 26° bucket rollback . . . insure heaped loads every time
- Clean 45° dump, 8'10" clearance with 30" reach
- One-motion, forward-reverse shifting
- Positive traction, power-in-turn steering
- Long-lasting ferrometallic-type clutch
- Heaviest track assemblies in its class

This same powerful, high-clearance "310C" crawler is offered with heavy-duty bulldozer or angling blade for land clearing, dirtmoving, pit clean-up, and other work where extra power, traction and flotation are needed. Winch, scarifier, full line of attachments.

CASE®

J. I. CASE CO., RACINE, WIS.

see and try... no obligation ...mail coupon for details

J. I. CASE CO., Dept. H1149, Racine, Wis.

Send free information on *Utility* rigs checked:

☐ 34 hp wheel tractor ☐ 42 hp wheel tractor ☐ 42 hp crawler

with: ☐ Loader ☐ Dozer ☐ Backhoe ☐ Other .....

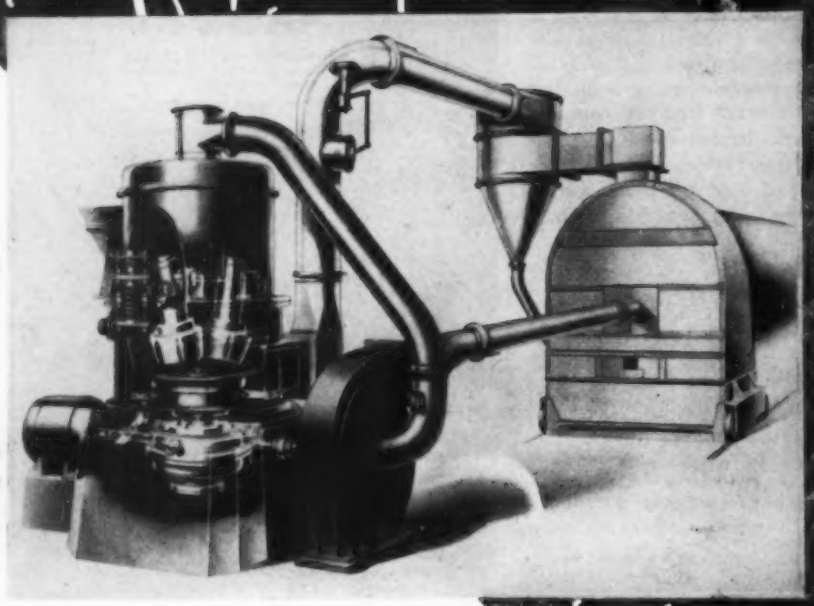
Name..... Position.....

Company .....

Address .....

City..... State.....

CU-L-74



RAYMOND BOWL MILL . . .

. . . for the 24-Hour DAY

Today's pressures for higher production in the nonmetallics industry can only be met by the use of machines capable of continuous trouble-free operation.

For direct-firing rotary kilns in lime and cement plants, the time-proved Bowl Mill answers all requirements. It is specially designed and built for non-stop service . . . 24 hours per day and for months at a time without shutdowns. It may be lubricated and adjusted, including compensation for wear on the rolls, while in operation.

Equally important . . . the Bowl Mill can handle coals of any grade or moisture content . . . high availability and wide range capacity . . . constant fineness of grind and proper air-coal mixture to burner for top kiln efficiency.

For today's emergency and tomorrow's economy, change to Raymond Bowl Mill firing . . . write for further details.

Write for RAYMOND BOWL MILL Catalog No. 75

COMBUSTION ENGINEERING, INC.

Raymond Division

1122 W. Blackhawk Street
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

BEMIS EXTENSIBLE MULTIWALLS...*THAT'S WHY!*

During the past twelve months,* Bemis has delivered more multiwall bags to the cement industry than in any similar period in its history.

*Period ended June 30, 1959

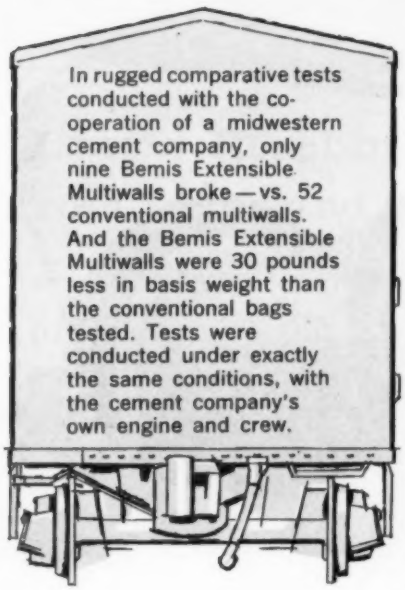
why?...BEMIS EXTENSIBLE MULTIWALLS!

And during this same period, cement plant management and packhouse crews, traffic men and building materials dealers, have noticed reduced bag breakage all along the line.

why?...again, BEMIS EXTENSIBLE MULTIWALLS

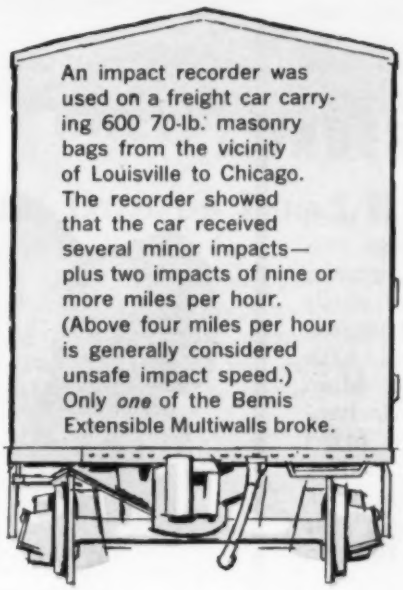
These bags, made of revolutionary "stretch" multiwall kraft paper with traditional Bemis skill, have performed amazingly well.

for example:



In rugged comparative tests conducted with the co-operation of a midwestern cement company, only nine Bemis Extensible Multiwalls broke—vs. 52 conventional multiwalls. And the Bemis Extensible Multiwalls were 30 pounds less in basis weight than the conventional bags tested. Tests were conducted under exactly the same conditions, with the cement company's own engine and crew.

another case:



An impact recorder was used on a freight car carrying 600 70-lb. masonry bags from the vicinity of Louisville to Chicago. The recorder showed that the car received several minor impacts—plus two impacts of nine or more miles per hour. (Above four miles per hour is generally considered unsafe impact speed.) Only *one* of the Bemis Extensible Multiwalls broke.

and in tests . . .

covering actual shipments made over a period of six months with the cooperation of nine eastern cement companies, Extensible Multiwalls outperformed conventional multiwalls by a substantial margin, even though they were from 11.7 per cent to 16.6 per cent less in basis weight.

If you haven't tested these rugged bags in your plant, call your Bemis man today.

why?

BEMIS EXTENSIBLE MULTIWALLS

—your best package for cement and related products

BEMIS

Where flexible packaging ideas are born

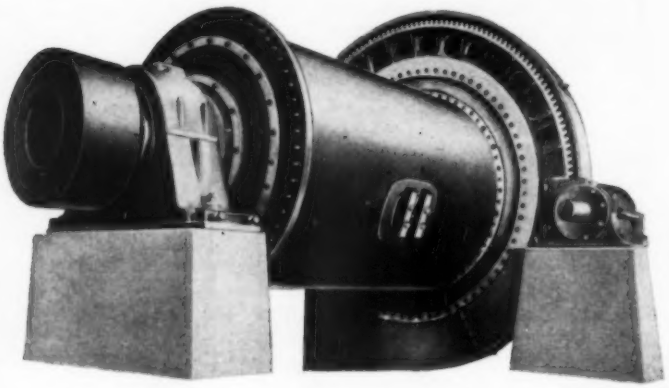
GENERAL OFFICES • 408 PINE STREET • ST. LOUIS 2

rugged dependable ball mills

Traylor-made for greater profit

Traylor Ball Mills are made in two types—overflow and diaphragm discharge. They are built for either wet or dry grinding.

Traylor Ball Mills feature shell liners of manganese or high carbon steel in plain, wave, cascade, lifter or Lorain types with shells of welded steel construction. Trunions are cast integrally with the detachable heads. Main bearings are made of Meehanite* metal, larger sizes fitted with a high-pressure Alemite pump. Driving gears are steel, precision-cut on our Maag gear generator. Write for Bulletin No. 11-121 today!



Traylor Grinding Mills are available in Ball, Rod, Compartment and Tube Mills.

GYRATORY CRUSHERS • JAW CRUSHERS
Traylor
ROTARY KILNS • BALL MILLS • APRON FEEDERS

ENGINEERING & MFG. CO.

1185 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco

Canadian Mfrs.: Canadian Vickers, Ltd., Montreal, P.Q.

Ask your Allis-Chalmers dealer to show you **"And A Great Deal More"**

Longer-Reaching TRACTOLOADER Stays Back From Truck and Still Dumps Load Right in Center

There's reach to spare with a TRACTOLOADER. Note that this TL-20 is not even up to the body of this 12-ton truck — 8 feet high, 8 feet wide — yet it's dumping right in the center. No time-consuming loading from both sides . . . no pitching . . . no wasting time dozing to distribute material evenly — and no banging-up truck and loader.

In addition to extra-long reach, both the big TL-20 and TL-16 loaders, and the medium-size TL-14 have *exclusive* ONE-LEVER speed and direction control. Operator works fast because he goes into and out of *any* forward or reverse gear at will, while moving, with one lever.

To make your TRACTOLOADERS even more productive, you get bigger-than-ever carry capacity. The TL-20 carries 9,000 lb and has a 130-hp diesel engine. On the TL-16, you get 7,000-lb carry capacity and a choice of a 109-hp gasoline or a 104-hp diesel engine. The new TL-14 has 5,300-lb carry capacity and gives you either an 83-hp diesel or an 86-hp gasoline engine.

To further increase the efficiency of your work, each of these loaders has a whole family of buckets. You choose the size that is most suitable for your operating conditions and the materials you handle. Buckets range from 2¼ to 5 yd for the TL-20; 1½ to 4 yd for the TL-16; 1 to 3 yd for the TL-14.

Let your Allis-Chalmers dealer help you decide which TRACTOLOADER would be best for you. Start getting that extra reach and extra production now. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

TRACTOLOADER is an Allis-Chalmers trademark.

move ahead with ALLIS-CHALMERS
...power for a growing world

FAST? HANG ON TO YOUR HAT!

SPEED makes the Bucyrus-Erie 22-B shovel king of the sidebank operation! Take a good look and see how and why!

Bucyrus-Erie's independent twin rope crowd pours on the power while you're digging . . . then when the bucket's full, the dipper retracts exceptionally fast. You get a fast head start on the swing and dump.

The crawlers help add speed, too. They put a nearly square platform under you . . . stand low and squat for maximum stability.

Nothing beats a Bucyrus-Erie shovel for sidebank operations! See one in action. Your Bucyrus-Erie distributor will gladly arrange a demonstration. Call him today, or write Bucyrus-Erie Company, South Milwaukee, Wisconsin, Dept. 46E.

BUCYRUS ERIE®

BUILDS BETTER EQUIPMENT

The Dravo-Doyle Company, Pittsburgh, Pa., has been appointed exclusive distributor in western Pennsylvania for the Kwik-Mix Company, Port Washington, Wis., on all products manufactured under its trademark, *Ka-Mo*.

A complete line of horizontal, vertical, and angle drilling tools in sizes ranging from 2¼ to 48 in. in diameter will be offered by Dravo-Doyle.

H. E. DAVIS has joined Mobile Drilling, Inc., Indianapolis, Ind., as district sales and service representative for 19 western states. He will work out of the Denver, Colo., office. Mr. Davis was for 10 years a materials handling engineer with the California Division of Highways.

ROBERT F. SUTHERLAND has been appointed sales representative in New York for Refractories Division, H. K. Porter Company, Inc., Pittsburgh, Pa.

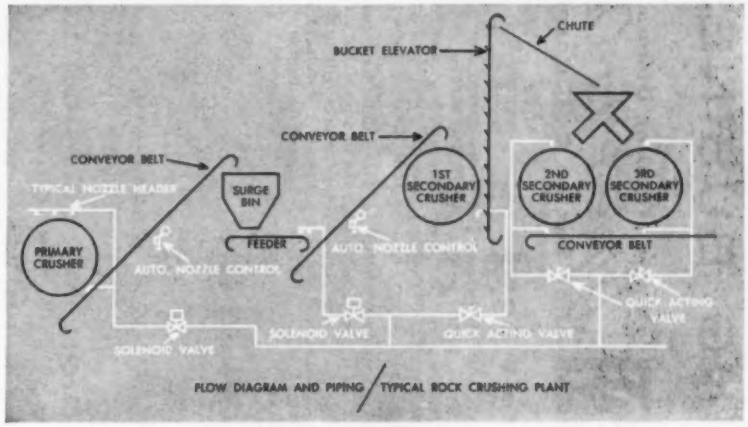
Previously with A. P. Green Fire Brick Company for 17 years in the New York area, Mr. Sutherland will now service all types of refractories accounts, and will work with J. F. Kane, New York district manager.

BILL HOWE and GLENN A. LONG have been promoted by Sherman Products, Inc., Royal Oak, Mich.

Mr. Howe has been promoted from assistant sales manager to sales manager. He joined Sherman in 1948 as a sales representative. Mr. Long, who has been advanced from assistant service manager to service manager, joined the company in 1950.

Power Brake & Equipment, Inc., St. Paul, Minn., is a new distributor for Highway Equipment Company, Cedar Rapids, Iowa, serving all of Minnesota with the exception of 10 counties in the northwestern corner of the state, and four counties in the southwest corner. They will handle *New Leader* lime spreaders, combination lime and fertilizer spreaders, wide spread lime and fertilizer spreaders, and mobile blenders.

JOHNSON MARCH ► chem-jet DUST CONTROL SYSTEM



DUST PROBLEM SOLVED economically at typical rock crushing plant. Drawing shows location of Chem-jet applications after system was engineered by Johnson-March.

NOW YOU CAN AFFORD DUST CONTROL

At a fraction of the cost of other methods, Chem-jet brings you efficient, practical dust protection. Chem-jet solves your dust problem by attacking dust at its source. It is the only system of its kind that effectively *prevents* dust from becoming airborne.

- **Low-Cost Dust Control—**

  No other system compares to Chem-jet for low first cost, low operation and maintenance.

- **Each Installation Engineered—**

  To solve each specific dust problem, Chem-jet systems are specially engineered to meet all requirements.

- **Effective Dust Control—**

  Carries through from crushers to stock pile without affecting screens.

Engineering analysis of your dust problem will be made at no obligation. Johnson-March Corporation, 3018 Market Street, Philadelphia 4, Pa.

JOHNSON MARCH DUST CONTROL ENGINEERS

Enter 153 on card, page 145

NEWS ABOUT THE COAL HAULING BUSINESS

Marion Trailer Dumps Provide
Triple Pay-Off
For Saxton Coal Corporation

MARION BODIES AND HOISTS

Here's how!

● **PAYLOAD BONUS...** This Indiana company put nine bigger (30 cu. yd.), lighter weight (with USS Cor-Ten steel) trailer dumps into operation, replacing nine 12-ton units . . . and hauling the same daily tonnage (2,000) of coal twice as far (from mine to tipple the distance is now 6 miles) at no increase in cost per ton mile.

● **PERFORMANCE BONUS...** These units have been in operation for two years, each making 9-10 round trips daily with an unusually small amount of downtime. (Marions are built to take it "under a shovel and under all hauling conditions.") A total of 7 other units of the same type have also been purchased for Saxton's operation. Big, rugged and fast front end telescopic hoists (model F-815-T-204) raise the bodies.

● **MAINTENANCE BONUS...** Marion engineering and manufacturing plus high strength steel provide long, maintenance-free life. Cor-Ten steel is highly resistant to atmospheric corrosion and has greater impact and fatigue strength.

Why not get complete information on Marion bodies and hoists. They're on-the-job designed with your profit in mind.

MARION METAL PRODUCTS CO.
Marion, Ohio

Enter 154 on card, page 145

Euclid Division (Cleveland, Ohio) of the General Motors Corporation has appointed San Diego Tractor & Equipment Company, San Diego, Calif., as authorized dealer for the complete line of Euclid earthmoving, mining, and construction equipment. This new dealer will cover San Diego and Imperial counties.

Cummins Engine Company, Columbus, Ind., has announced the appointment of VERNON HILL to its sales staff. He has been associated with the mining and construction industries for 13 years.

Mr. Hill will contact manufacturers, contractors, and other power users in the mining and construction fields. His area will be the midwestern United States and central Canada.

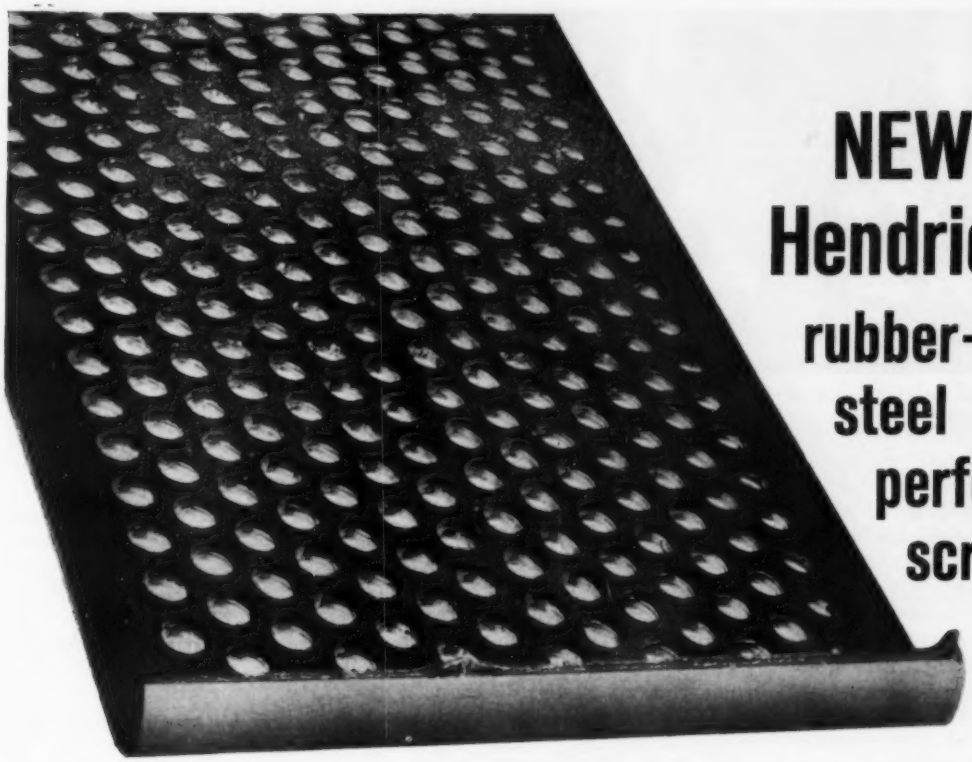
Hudson Pulp and Paper Corporation, New York, N. Y., has appointed WILLIAM F. HAZLEWOOD as New York Division manager.

Mr. Hazlewood joined Hudson in 1952, and in 1955 was appointed to the Multiwall Department, where he has been serving as district manager in New York.

HOWARD K. NORRIS has been named production manager of the mechanical goods division of United States Rubber Company, New York. N. Y. Mr. Norris has succeeded W. A. ARMSTRONG, production manager of the division since 1949, who retired.

Trans-Weigh Company, King of Prussia, Pa., has appointed the Control Equipment Company, Birmingham, Ala., and Atlanta, Ga., as its representative in Alabama, Florida, Georgia, and eastern Tennessee.

A. R. BLACK JR. has been named sales manager of the Lodestar Corporation, Niles, Ohio, manufacturer of a line of aluminum and steel truck dump bodies and trailer dumps. He will also head sales for Niles Machine and Welding Company, an affiliate.



NEW Hendrick rubber-clad steel perforated screen . . .

. . . the best way to beat abrasion!

this picture shows you why

The top layer of the Hendrick screen is made from the same kind of long-wearing rubber that is used in auto tire treads. This rubber blanket takes the brunt of the wear—outlasts conventional screening materials in the toughest service.

Between the two layers is a special adhesive that keeps them sealed tightly together for the life of the screen. The lower section is durable Hendrick Perforated Steel Plate bonded to the rubber by hydraulic pressure to assure a complete, lasting, lamination.

The joined sheet is steam-cured. Result? Extra durability, even in applications where extreme abrasive conditions usually cause screen wear.

Hendrick rubber-clad steel perforated plate is available in a wide range of thicknesses, so you can easily choose one to satisfy your individual screening application. Write today for complete information and sizes.

Rubber-Clad Steel Screens are Patented #2,861,326.

Hendrick

MANUFACTURING COMPANY

39 Dundaff Street, Carbondale, Pa.

Perforated Metal Screens • Wedge Wire Screens • Cascade Wedge Wire Screens • Wedge Slot Screens • Rubber Clad Perforated Screens
Flanged Lip Screens • Flights • Shaker and Conveyor Troughs

A.E.D.'s Industry Round Table, composed of ten leading equipment distributors and twenty manufacturers, met recently at the Drake Hotel in Chicago.

Better methods of selling and servicing construction machinery was the underlying theme of a one-day meeting of 25 leading distributors and manufacturers, who met in Chicago, Ill. The participants are members of the Industry Round Table, a major committee of the Associated Equipment Distributors.

High on the conference agenda were discussions of marketing, sales procedures, and ten key questions on distributor-manufacturer co-operation for improvement in service to users of construction machinery. The questions considered dealt with subjects suggested by distributors throughout the United States and Canada.

Presiding at the meeting were co-chairman H. M. Doolen, Western Construction Equipment Company, Billings, Mont., and J. W. Hardesty of Baldwin-Lima-Hamilton Corporation, Lima, Ohio. A.E.D. President F. J. Fitzpatrick (Parker-Danner Co., Hyde Park, Mass.) took an active part in the session and acted as official host for the Association.

A.E.D. staff members in attendance were: Frank Skidmore, director of industry relations; Joseph T. King, Washington counsel; W. G. Bowman, administrative assistant; and R. E. Hook, assistant director of industry relations.

The W. W. Sly Manufacturing Company, Cleveland, Ohio, has appointed two representatives for its dust control systems, industrial ovens, blast cleaning equipment, and tumbling mills.

The newly-formed Sinclair-Brandt Equipment and Supply Company, Houston, permits expanded sales and service in Texas. Devlin Brothers, New Orleans, has been appointed as Louisiana representative.

GEORGE V. MCCLURE has been appointed sales manager for the Salt Lake City office of the Industrial Sales Division of the Western Machinery Company, San Francisco, Calif.

Prior to his appointment as sales manager, Mr. McClure was assigned as a field sales representative at the company's Salt Lake City office. He joined the firm in 1944.

HAROLD W. SPEIDEL has been appointed manager of sales product planning, SKF Industries, Inc., Philadelphia, Pa. Mr. Speidel joined SKF in 1940, and was formerly district manager of Philadelphia area sales.

The Koehring Company, Milwaukee, Wis., has promoted R. E. BURTON, to president and general manager of its Buffalo-Springfield Division at Springfield, Ohio. Mr. Burton was formerly attached to the Koehring central office staff in Milwaukee as assistant director of marketing.

The Buffalo-Springfield Division is being enlarged to include the operations of the Stardrill-Keystone Company, Beaver Falls, Pa., purchased in January by Koehring.

BROOK ELECTRIC MOTORS ARE BEST!

All things considered, BROOK A. C. MOTORS are best for powering crushers, screens, washers, apron feeders, and conveyors in sand and gravel pits and quarries. They are built for dependable, maintenance-free, all-weather service under severe conditions. Yet, they *cost less* than ordinary motors. 1 to 600 H.P. Warehouse stocks, factory representatives and dealers coast-to-coast. Send for literature.

SINCE 1904
BROOK MOTOR CORPORATION

world's most respected motor

BROOK MOTOR CORPORATION
3302 W. PETERSON AVE., CHICAGO 45, ILL.
In Canada: Brook Electric Motors of Canada, Ltd.
250 University Ave., Toronto, Canada

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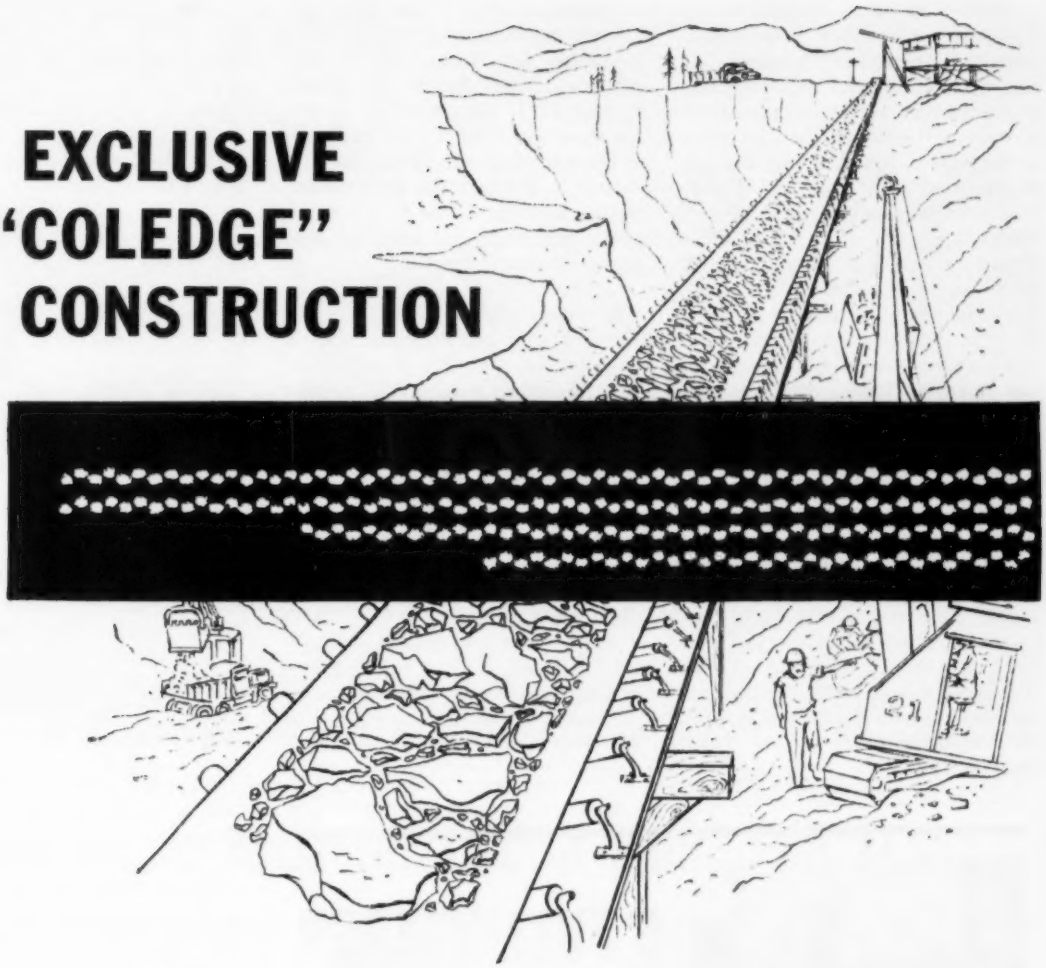
EXCLUSIVE "COLEDGE" CONSTRUCTION



Quaker Thermoid gives Conveyor Belting extra life where it counts

Punishment at the edges—especially the tough use dealt out in quarrying—can kill most conveyor belting in a fraction of the time that Thermoid-Quaker Conveyor Belting lasts. The unique "COLEDGE", though, available on all grades of Thermoid-Quaker Conveyor Belting, puts more rubber where it's needed, makes a more flexible and wear-resistant edge where the abrasion is greatest. Tests show Thermoid-Quaker Belting with "COLEDGE" construction lasts and lasts on the same jobs where other belting fails.

What's more, all Thermoid-Quaker Conveyor Belting is *prestressed* in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Conveyor Belting with the exclusive "COLEDGE" construction at your Thermoid distributor's, or write for further information to *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*

THERMOID DIVISION PORTER H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Copper and Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY DE MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

Allis-Chalmers Manufacturing Company's acquisition of the Tractomotive Corporation, Deerfield, Ill., has been completed following approval by the Tractomotive board of directors. It becomes the 21st plant in the Allis-Chalmers family and will be operated as the Deerfield Works.

The acquisition was made through the exchange of 2.25 shares of Allis-Chalmers common stock for each share of Tractomotive. John W. Carlson, who had served as president of Tractomotive Corporation, has been named general manager of the Deerfield Works, which is now part of the Construction Machinery Division.

Allis-Chalmers, acquisition of the Lakefield Manufacturing Company, Wauwatosa, Wis., has also been completed.

Kenneth J. Qualman, previously plant manager, has been named works manager of the newly acquired facilities, which will be operated as the Wauwatosa Works. Lakefield has been a supplier for Tractomotive and will now operate in conjunction with the new Deerfield Works.

JAMES F. ANGLE has been appointed district manager of the newly-created Salt Lake City district office of The Okonite Company, Passaic, N. J. He previously served for three years as a sales engineer in Okonite's Los Angeles office.

SAM R. HOWARD has been named district manager of the Los Angeles office, where he has been a sales engineer since 1956.

The Marine and Industrial Engine Division of Chrysler Corporation has announced that it will supplement its line of gasoline powered marine and industrial engines with a complete line of diesel engines. An agreement has been signed with Klockner-Humboldt-Deutz of Germany and its subsidiary, Diesel Energy Corporation in New York, to represent their high-speed engines in the United States.

Diesel Energy Corporation, which has sold engines in this country through its dealer and distributor organization, will co-operate with Chrysler in this merchandising program.

Until recently foreign sales manager of the Pennsylvania Crusher Division of Bath Iron Works, in the employ of W. R. Grace & Company, DAVID OWENS has assumed new duties as sales manager of Pennsylvania Crusher at the main offices in West Chester, Pa.

D. Owens

J. W. Cunningham

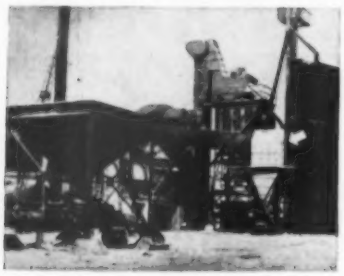
Bailey Meter Company, Cleveland, Ohio, has named J. W. CUNNINGHAM manager of the company's Atlanta district office. He succeeds M. J. MCWHORTER, who has retired from the company after 38 years of service. Mr. Cunningham joined Bailey Meter in 1947.

CHARLES L. ELLIS has been appointed chief field engineer of the Construction Machinery Division of Clark Equipment Company. Mr. Ellis will direct all field engineering activities in connection with *Michigan* construction machinery.

Before joining Clark as field engineer in 1957, Mr. Ellis had been an excavating contractor and had spent three years in field engineering and product development at LeTourneau-Westinghouse Company.

Appointment of the Horace T. Potts Company, Philadelphia, Pa., as a distributor of Reynolds aluminum pipe for Reynolds Metals Company, Richmond, Va., has been announced.

A. M. LANE has been appointed commercial markets development manager for Vickers Incorporated, Detroit, Mich. Mr. Lane, who was most recently general sales manager, Mobile Hydraulics Division, has been with the organization since 1940 in various sales and engineering assignments. He will now direct exploration and development of hydraulic applications in areas not presently served by Vickers.



5 FULL YEARS
ON STONE DRIER
—HIGH-EFFICIENCY COLLECTION
—NO MAINTENANCE COST!

This Dustex Miniature Cyclone Collector has been on the job at Rock Road Construction Co. in Chicago for five years, and a second Dustex, for four years.

"We have yet to spend any money for maintenance and repair," the firm reports. "You claimed high-efficiency collection and low maintenance costs. Your claims have been fully substantiated."

SEE ACTUAL COLLECTION PERFORMANCE
of Dustex on your site, at no cost or obligation! Write for this Dustex Bulletin, "A Simplified Test Method."

25 ANDERSON ROAD • BUFFALO 25, N. Y.

Dustex CORP.

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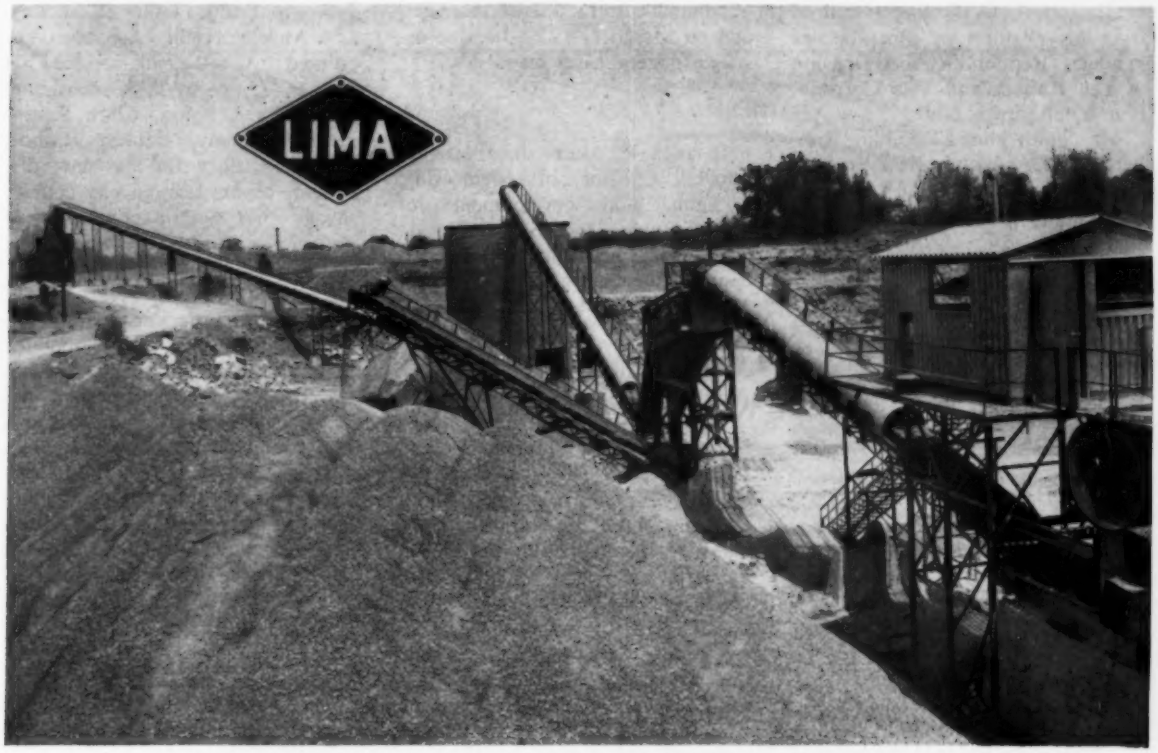
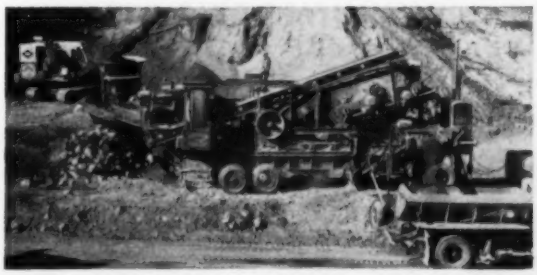


Stationary Lima A-W installation, equipped with 32 x 40 in. primary jaw crusher, produces materials to 10 specifications. Conveyor covers help hold down dust, prevent materials from falling.

Lima Austin-Westerns CRUSH MORE FOR LESS!

"You simply cannot buy better crushing equipment than that made by Lima Austin-Western. It's tops—ruggedly built of high-quality materials; engineered to economically produce high tonnage hour after hour without lost production time or costly breakdowns. In our experience, maintenance costs and requirements on Lima A-W equipment are extremely low; distributor service excellent." That's what Craig Fenton, president of the Northwood Stone & Asphalt Co., Belle Center, Ohio, says about his company's stationary Lima A-W installation.

Lima Austin-Western offers a complete line of portable and stationary crushing and screening plants. Designed and quality built to set new standards of high-volume production of accurately sized gravel or rock over long years of trouble-free service.



Lima Austin-Western portable 101-SE crushing and screening plant with mechanical feeder is served by 1-yd. Type 44 Lima shovel.

The Lima A-W line includes many sizes of jaw and roll crushers, matching screens, elevators, conveyors and bins. Apron or reciprocating feeders control material flow, eliminate overloading, choking and surging. Centralized power plants, anti-friction bearings, and fewer shafts, belts and gears help keep operating costs low.

Learn how you can increase your pit or quarry production and at the same time reduce tonnage costs! See your nearest distributor or write us today: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

5951

On July 1, G. L. SMITH retired from his position as general sales manager, Republic Rubber Division of Lee Rubber and Tire Corporation, Youngstown, Ohio.

Mr. Smith joined Republic Rubber in 1923, selling in New England

G. L. Smith

C. R. Conklin

and Upstate New York. In succeeding years he served the Youngstown office in positions of increasing responsibility, becoming general sales manager in 1953.

C. R. CONKLIN, assistant general sales manager, will succeed Mr. Smith as general sales manager. Mr. Conklin joined Republic in 1926 as a salesman in the Philadelphia and Baltimore areas. In 1947 he was appointed eastern district manager, and on March 1, 1959, became assistant general sales manager.

ROBERT R. ALLEN has been appointed director of engineering, research, and development for Hewitt-Robins, Inc., Stamford, Conn. He was formerly vice-president of engineering and research of the John Wood Company, New York.

Brunner & Lay—Eastern, Inc., has opened a new branch at Long Island City, N. Y. It will carry a complete line of air tool accessories and blast hole rock drilling tools. The plant is equipped for tool sharpening, as well as bit and drill steel reconditioning.

Brunner & Lay—Western, Inc., has completed building a new plant and warehouse at Spokane, Wash. Dick Davis is district manager; Claude Thomas, plant superintendent; and Jim Smith, outside sales engineer.

Smith Booth Usher Company, Los Angeles, Calif., has been appointed to sell and service the *Michigan* line of the Construction Machinery Division, Clark Equipment Company, Benton Harbor, Mich. Territory for the new distributor covers Los Angeles county, seven other nearby counties, and part of San Bernardino county.

Rankin Manufacturing Company, Alhambra, Calif., has appointed HARRY RANKIN to direct research and product development activities in the field of hardsurface welding. The company has more than doubled the area of its research laboratories and has installed new equipment for qualitative and quantitative analysis of existing and experimental alloys used in the manufacture of *Ranite* metallic-coated electrodes and the new *Ranomatic* wire.

Baughman Manufacturing Company has purchased the former International Shoe Company plant in Jerseyville, Ill. Plans call for fabrication of parts and smaller products assembly in the new plant while assembly lines for larger bodies will be maintained in the original Baughman plant.

A. L. SCHRIML has been named product sales manager for the new line of Dayton poly-V drives by Dayton Industrial Products Company, a division of The Dayton Rubber Company, Dayton, Ohio.

In his new post Mr. Schriml will formulate the sales promotion and merchandising programs on poly-V drives. He joined Dayton Rubber in 1936 and has handled several engineering and sales assignments. Since 1949 he has been working out of the company's Chicago office.

The Daybrook Hydraulic Division, Young Spring & Wire Corporation, Bowling Green, Ohio, has appointed H. A. HARRISON as advertising and sales promotion manager. Previously, Mr. Harrison served as advertising account manager, Gradall Division, The Warner and Swasey Company, Cleveland, Ohio.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

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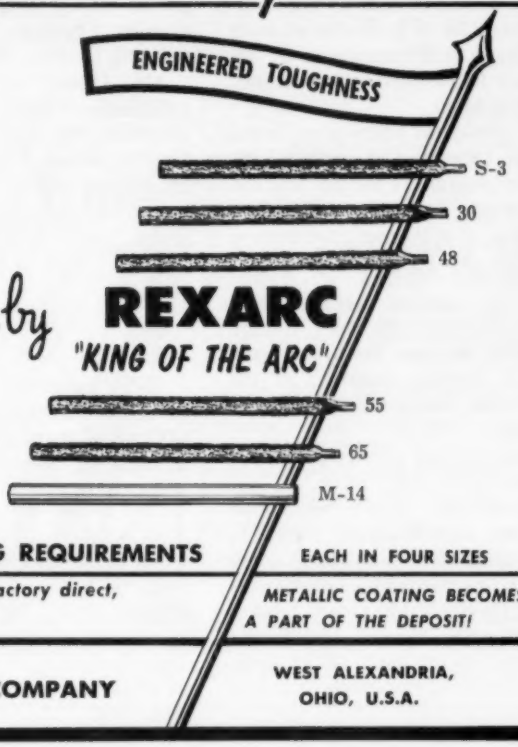
BETTER WELDS ★ SMOOTHER, EASIER APPLICATIONS ★ ADDITIONAL SAVINGS ★ BETTER WEAR RESISTANCE

ENGINEERED TOUGHNESS



A royal proclamation by **REXARC**
"KING OF THE ARC"

presenting:

SIX ELECTRODES
TO COVER 95% OR MORE OF
YOUR BUILDUP AND HARD-FACING REQUIREMENTS

EACH IN FOUR SIZES

Contact your nearest distributor, or the factory direct, for free 20-page manual

METALLIC COATING BECOMES A PART OF THE DEPOSIT!

MANUFACTURED BY
The SIGHT FEED GENERATOR COMPANY

WEST ALEXANDRIA,
OHIO, U.S.A.

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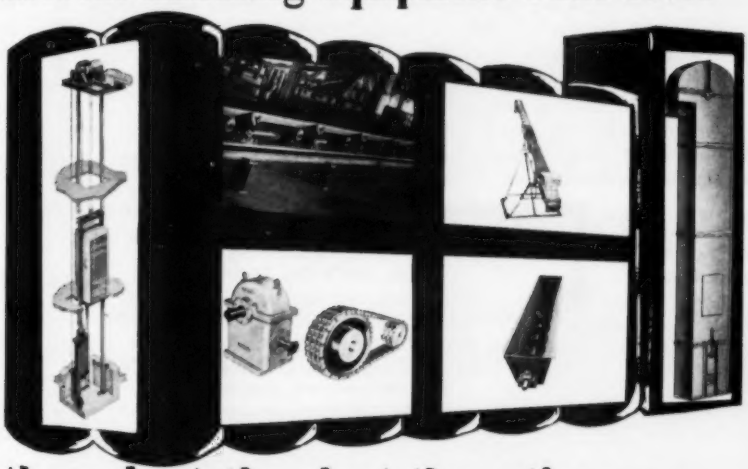
EHRSAM

Material Handling Equipment That Gives

Efficiency And Economy



throughout the plant the entire year

The J. B. Ehrsam and Sons Mfg. Co.
Enterprise, Kansas

SALES OFFICES:
KANSAS CITY, KANSAS
PHOENIX, ARIZONA

REPRESENTATIVES:
EHRSAM PACIFIC, INC. — SAN FRANCISCO, CALIFORNIA
WILKS-BERMEL CO. — LANCASTER, NEW YORK
THOMER EQUIPMENT CO. — MINNEAPOLIS, MINNESOTA

Enter 161-B on card, page 145

The appointments of JOHN D. SHARP as district sales manager and JOHN J. MCCLANAHAN as sales representative for a new district sales office have been announced by Industrial Brownhoist Corporation, Bay City, Mich.

The new sales office was opened on June 15 as part of a general expansion program of the 86 year old corporation. Located in Birmingham, Ala., it will serve customers in the south and southeast.

At the annual organizational meeting held recently, the J. I. Case Company, Racine, Wis., re-elected JOHN T. BROWN chairman of the board and MARC B. ROJTMAN president.

Newly elected as vice-presidents of the company were D. A. BECKENBAUGH, sales and manufacturing administrator; JACK L. BUSH, controller; GORDON A. MCMILLAN, director of Canadian operations; DAVID A. MILLIGAN, head of the industrial division; and FRANK J. PALERMO, in charge of the eight-plant diversified manufacturing operations.

A. L. CANEY has been appointed to the new position of midwest regional sales manager, Mobile Hydraulics Division, Vickers, Incorporated, Detroit, Mich.

Mr. Caney will supervise the company's mobile hydraulic sales activities throughout the central United States, which are covered by district offices located in Chicago, Minneapolis, Houston, and Tulsa. He will be located in suburban Chicago at the new Midwest Branch.

SKF Industries, Inc., Philadelphia, Pa., has appointed GEORGE E. O'CONNOR to the newly-created post of manager, market analysis.

Worthington Corporation, Harrison, N. J., has selected Lewis & Coulter, Inc., Pittsburgh, Pa., to handle the distribution of construction equipment in various counties of Pennsylvania, West Virginia, and Maryland.

Raybestos-Manhattan, Inc., Passaic, N. J., has announced changes in its sales structure. R. B. PARKS, formerly San Francisco district manager, has been appointed assistant sales manager for industrial rubber products and packings. A new marketing group section of its sales division has been established that will co-ordinate all activities of marketing and work closely with production, development, sales engineering, and product sales departments.

R. B. Parks

S. J. Synnott

S. J. SYNNOTT has been appointed general marketing manager of industrial rubber products, and will direct activities of industrial rubber marketing managers assigned to specific product groups. Newly appointed members of this rubber product group are: H. J. SEELEY, marketing manager for poly-V drives and flat transmission belts; A. ARGUEDAS, for conveyor and elevator belts; J. J. CONNORS, for rubber covered rolls.

G. E. HORVATH has been made marketing manager of mechanical packings. R. E. STYLES replaces Mr. Park as San Francisco district manager; N. L. RUSH, previously manager of distributor sales of the Philadelphia district, is now Minneapolis district manager.

Heil Equipment Company of Boston, Brighton, Mass., is a new distributor for Highway Equipment Company, Cedar Rapids, Iowa. Heil will serve the states of Maine, New Hampshire, Rhode Island, and eastern Mass.

Truck & Tractor Equipment, Ltd., Dixie (Toronto), Ont., Canada, has been appointed a distributor for Bucyrus-Erie Co. of Canada, Ltd., Guelph, Ont. The new distributor's territory includes southern and northeastern Ontario. Parts and servicing facilities are maintained at the distributor's plant.

Superior Scaling spells **M-O-R-E P-R-O-F-I-T-S!**

SCHAFFER POIDOMETERS are the "last word" in versatile, reliable weighing machines, as attested by hundreds of bulk material processors.

These high-speed, high-precision, automatic units help maintain maximum output of uniform products from your equipment.

Poidometers are easy to install—simple to operate. They outdistance all competition in providing continuous, economical service.

Available with total weight recorders, and remote control devices for showing and changing feed rate.

Battery of Poidometers in Process Industry

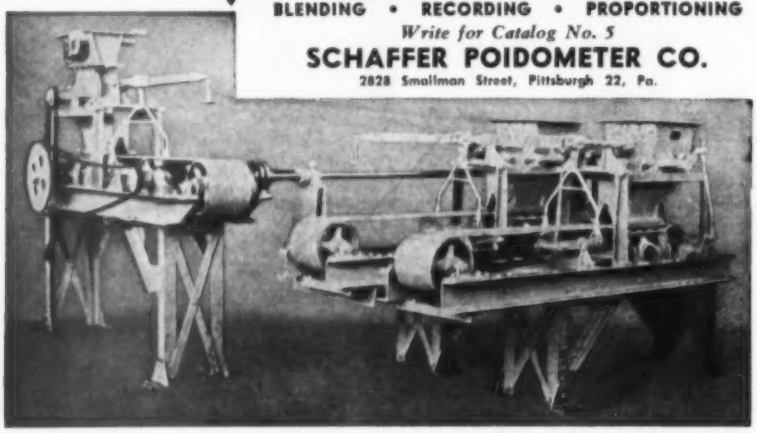
OVER 1500 now serving Industry

WEIGHING • MIXING • FEEDING
BLENDING • RECORDING • PROPORTIONING

Write for Catalog No. 5

SCHAFFER POIDOMETER CO.

2828 Smallman Street, Pittsburgh 22, Pa.



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PANG

for fast, on-the-spot

CONVEYOR BELT REPAIRS

Exclusive cold self-vulcanizing material

- No heat, no equipment needed
- Applied without removing belt
- Ever-last bond won't melt, unaffected by moisture, petroleum, most acids
- Eliminates danger of heat damage to belt during repairs
- PANG cuts repair costs, adds years to belt life

Write for prices and details:

PANG

AUTOMATIC VULCANIZERS CORP.

16 Hudson Street, New York 13, N. Y.

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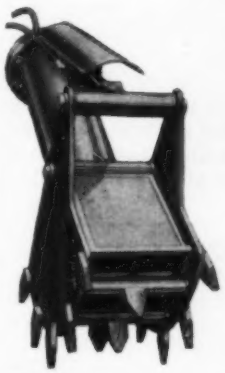
DREDGING PROBLEMS?



Van Gorp's "AGGRETATOR" is designed to increase production with a small investment

OUTSTANDING BENEFITS

How many tons of material do you loose every year in your dredging operation because of bad pumping conditions? Such as clay seams, large rocks or a cemented deposit. These conditions, of course, greatly reduce your dredging efficiency.

The Van Gorp "AGGRETATOR" will cut through clay seams, will push large rocks away from the suction nozzle and will loosen a cemented deposit.

The "AGGRETATOR" is easily installed on your present suction line. Existing power will be adequate to drive the hydraulic pump, and it is not necessary to build an expensive boom or to build a larger barge.

SIZES... Available For 6", 8", 10" or 12" SUCTION LINES.

WRITE FOR *Free* BROCHURE

Van Gorp Mfg. Inc.

BOX 123 • PELLA, IOWA

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A BOON TO TRUCK CRANE OWNERS

INCREASE YOUR MOVING CAPACITY in both Short and Long Stick operations UP TO 50% with

that FIT ALL MAKES AND MODELS OF TRUCK CRANES

- ALLOW NEAR-CAPACITY LOADS TO BE MOVED OVER LEVEL AND RUGGED TERRAIN
- ELIMINATE COSTLY, TIME-CONSUMING PRACTICE OF SETTING AND RE-SETTING OUTRIGGERS AND PADS
- ALLOW GREATER LOAD DISTRIBUTION AND PREVENT OVER-STRESSING CRANE CARRIER
- TANDEM, PIVOTAL ACTION WHEEL ASSEMBLY
- RUGGED CONSTRUCTION
- INSTALLED IN FIVE QUICK MINUTES

One Pair *Single Tandem Units*, Weight approx. 1360 lbs.

One Pair *Double Tandem Units*, Weight approx. 2630 lbs.

"ROLLING OUTRIGGERS" INSURE MOBILITY, SAFETY AND INCREASED PROFITS

Manufactured by Lincoln Welding Works, Inc., 1320 So. "A" St., Las Vegas, Nevada

WRITE FOR NAME OF "ROLLING OUTRIGGERS" DEALER IN YOUR AREA

SOME EXCELLENT DEALERSHIPS ARE STILL AVAILABLE

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DREDGE SLEEVE CLAMPS

Sturdy • Practical • Dependable • Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.

9th Ave. at 4th, Mendota, Illinois

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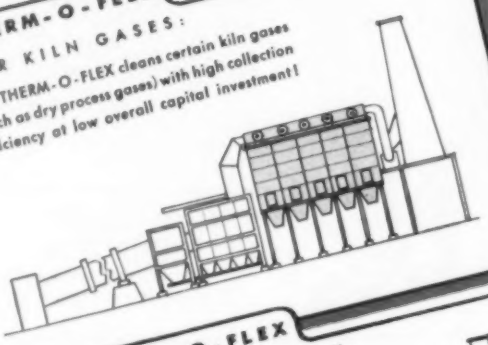
WESTERN PRECIPITATION'S

NEW THERM-O-FLEX COLLECTOR

CLEANS GASES TO 550°F with VIRTUALLY 100% COLLECTION!

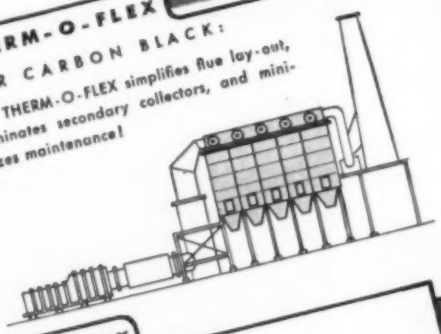
THERM-O-FLEX FOR KILN GASES:

The THERM-O-FLEX cleans certain kiln gases (such as dry process gases) with high collection efficiency at low overall capital investment!



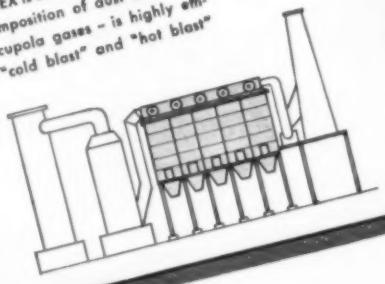
THERM-O-FLEX FOR CARBON BLACK:

The THERM-O-FLEX simplifies flue lay-out, eliminates secondary collectors, and minimizes maintenance!



THERM-O-FLEX FOR CUPOLA GASES:

The THERM-O-FLEX is unaffected by the varying chemical composition of dust and fume particles from cupola gases – is highly efficient on both "cold blast" and "hot blast" processes!



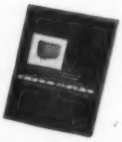
Western-Precipitation brings another important new advancement to the gas cleaning field — the THERM-O-FLEX Collector — a filter type of unit with many advantages over conventional filter equipment...

- The THERM-O-FLEX features glass silicone treated filter tubes that efficiently handle gases as hot as 550° F!
- The THERM-O-FLEX tubes are cleaned *automatically* by intermittent collapsing (not by destructive shaking). This assures uniformly low pressure drop combined with long filter life!
- The THERM-O-FLEX has *no moving parts* — nothing to require frequent servicing or replacement!

RESULT — highest collection efficiency combined with lower cost, less maintenance and uniformly low pressure drop on a wide range of applications, a few of which are shown at left.

Let Our Experienced Engineers study your dust or fume collection problem — *large or small* — and show exactly how **THERM-O-FLEX** gives new standards of performance at low installation costs. No obligation, of course!

HELPFUL NEW BULLETIN describes multiple Therm-O-Flex savings, outlines applications, technical data. *Ask for Bulletin #F105!*



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2—Rotary dryers, 6′ x 36′, ½″ material

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1—Link Belt roto louver dryer, Model 1003-30

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3—S-45 Butler single compartment bins

5—Barber-Greene permanent belt conveyors Total length 577', complete with all accessories and supporting structures

1—Barber-Greene 24" x 91' self propelled radial stacker

All motors, starters, switches and wiring included.

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36" & 42" x 60' Belt Conveyors
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125-75-35-20-15-10-7½ HP Exp. Proof Mtrs.
We need 50", 4-roll, High-side Raymond Mill

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Eagle paddle type Log Washer—Unused Surplus—Twin 36" in 7' x 20' tub on steel wheels

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WANTED—USED

1—Vibrating Screen about 50 sq. ft.
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also considerable other miscellaneous sand and gravel equipment, pipe & conveyors.

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BONDED QUALITY BARGAINS

BONDED ® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

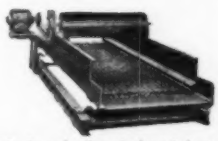
Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

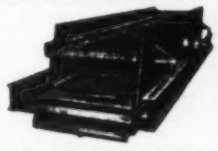
We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1397	$ 738	
14"	50'	2222	1159	$16.84
14"	85'	3377	1748	
16"	20'	1262	667	
16"	45'	2137	1118	18.04
16"	60'	2662	1388	
16"	90'	3712	1930	
18"	25'	1477	787	
18"	45'	2217	1182	
18"	70'	3142	1663	19.24
18"	85'	3697	1952	
18"	100'	4252	2240	
18"	130'	5362	2817	
20"	25'	1517	835	
20"	60'	2882	1548	20.37
20"	75'	3467	1854	
20"	90'	4042	2159	
24"	25'	1590	888	
24"	45'	2430	1334	
24"	70'	3480	1878	21.78
24"	100'	4740	2532	
24"	120'	5580	2967	
24"	150'	6840	3621	
30"	50'	2911	1617	
30"	70'	3871	2112	24.75
30"	90'	4831	2607	
36"	25'	1818	1118	
36"	45'	2858	1677	27.95
36"	60'	3638	2096	
36"	100'	5718	3214	

BONDED ® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS





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PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086. #1086.**

Model Number	Screening Area	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	688
336A	3'x6'	3	956
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	996

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1620
436B	3'x6'	4	1685
138B	3'x8'	1	1510
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	2440
2410B	4'x10'	2	2400
3410B	4'x10'	3	2550
2412B	4'x12'	2	2580
3412B	4'x12'	3	2970
4412E	4'x12'	4	3165

BONDED ® QUALITY BUILT BUCKET ELEVATORS

ENCLOSED ELEVATOR

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models mean lower prices and you get a Custom Built Elevator at no extra cost. Open and other types priced on request. There is a style of bucket for virtually every material or condition; wet or dry, lumpy or fine, granular, slivery, or pellet shaped, hot or chemically active.

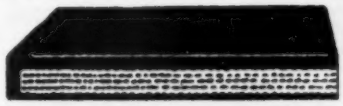
Prices listed at right are for Vertical Enclosed Elevators. Standard Elevators with Chain mounted buckets use #477 or #C102B combination chain, 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted Bucket Elevators.

Bonded Bucket Elevators are Jig Built to insure easy Job-Site Installation. **WRITE FOR BULLETIN #1203**

Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5 x 3¾	$1071.50	$20.25
C64A	6 x 4	1088.50	21.00
C85A	8 x 5	1235.00	25.50
C106A	10 x 6	1281.00	27.50
C127A	12 x 7	1510.00	31.25
C148A	14 x 8	1673.00	34.00
Style "A" Spaced Malleable Buckets on Belt			
B53A	5 x 3½	$1099.00	$20.50
B64A	6 x 4	1116.50	21.25
B85A	8 x 5	1311.50	27.25
B106A	10 x 6	1692.50	33.00
B127A	12 x 7	1854.50	37.25
Style "E" Continuous Steel Buckets on Chain			
C85E	8 x 5 x 7¾	$1397.00	$31.25
C126E	12 x 6 x 11¾	1589.00	34.25
C108E	10 x 8 x 11⅝	1604.00	34.75
C128E	12 x 8 x 11⅝	1624.00	35.50
C148E	14 x 8 x 11⅝	1710.00	36.75
Style "E" Continuous Steel Buckets on Belt			
B85E	8 x 5 x 7¾	$1727.50	$34.50
B116E	11 x 6 x 8¾	1838.50	38.75
B128E	12 x 8 x 11⅝	2013.00	43.50

NEW CONVEYOR BELTING SAVE UP TO 34%

WE PAY FREIGHT ON 200 POUNDS OR OVER



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile. Heavy Duty 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$3.63	$2.83
16"	4	4.08	2.97
18"	4	4.51	3.29
20"	4	4.97	3.80
24"	4	5.85	4.26
30"	4	7.18	5.21
36"	4	8.51	6.18

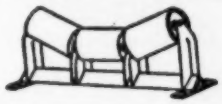
Major Bee Brand: 16# to 19# Average Friction Pull. 2400# to 3000# Average Cover Tensile. Skim coat between plies. A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$4.31	$3.06
16"	4	4.85	3.46
18"	4	5.39	3.83
20"	4	5.90	4.37
24"	4	6.94	4.94
30"	4	8.53	6.07
36"	4	10.09	7.35
24"	5	8.14	5.78

*All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices. **WRITE FOR SAMPLE AND BULLETIN #1234.**

BONDED® IDLERS & RETURN ROLLS SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50
1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

More than 7,000 Mines & Quarries Have Modernized with Bonded Equipment.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213, HU. 6-3154**

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1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap., 200-275 tons per hour, UNUSED.
1—Penn. Super-Thor Hammermill, size SXT-13, 250 HP.
5—Raymond Bowl Mills, Two Roll, 60 HP.
3—Bradley 6' Hercules Mills, 300 HP.
3—Raymond 5 Roll Low Side Mills.

AIR SEPARATORS—SCREENS

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1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
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1—Raymond 30" dia. Whizzer Separator.
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1—Robins 84" x 22' Conveyor, 15 HP.
1—Robins 24" x 14' Belt Conveyor, 3 HP.
1—Robins 18" x 30' Troughing Conveyor.
1—Fuller-Kinyon Conveying System, type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10-B-No. R, 75 HP.

For Inquiries on Boilers, Diesel Generator Sets, Turbo Generator Sets, Steam Engines, write to our Department P-2

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56" x 72" Traylor Style G
36" x 42" Farrell Bacon

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42" x 16" AA & 42" x 16" B-Allis Chalmers

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1—Cedar Rapids Comander 150/200 T.P.H.

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No. 6 McCully
17" Kennedy Van Saun Gearless
16B Telsmith
20" Allis Chalmers Superior McCully
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No. 11 McCully

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1—35' Haiss portable conveyor, 30" trough type belt. Like new. Used for three hours on demonstration only. Powered with Wisconsin air cooled engine. Capacity — 470 tons per hour.

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2½ yd. **Northwest** Shovel
3½ yd. **P&H** Shovel
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60-ton, two-compartment, 8' x 18' storage bin with clam gates.
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Special bins to your specifications.
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Lorain TL-25, ¾-yd. diesel basic machine.
Lima 34 Paymaster ⅝-yd. diesel shovel. Good.
Unit 1020 ¾-yd. diesel powered shovel.
Koehring 304, ¾-yd. diesel shovel-backhoe.
P&H 255A, ⅝-yd. diesel crane.
Unit 614, ½-yd. diesel backhoe. Good.
Bucyrus-Erie 10B, ⅜-yd. gas shovel-backhoe.
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Lorain TL-20, ¼-yd. Diesel Backhoe.
Link Belt HC-90, 25-ton truck crane.
Michigan TLDT-20, 20-ton truck crane.
Lorain MC-110, 10-ton gas Moto-Crane.
Lorain MC-4 15-ton gas Moto-Crane.
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Lorain 36, ¾-yd., 19' boom, 16' stick.

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Century-Continental 15 KW, 1200 RPM, 3/60/120-208.
Cummins 25 KW, 1200 RPM, 3/60/120-208.
Caterpillar 40 KW, 1200 RPM, 3/60/220/440.

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1—5' x 12' three deck Model VCG Gyroset enclosed vibrating screen.
1—4' x 20' Rotary Dryer
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P.O. Box 116 Waukesha, Wisconsin

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"*Angeline*" Rounds Out 2nd Year of Service. Meet "Angeline"—a Bethlehem-wire-rope-equipped dragline excavator, the latest addition to the coal-stripping equipment operated by Pennweir Construction Co., Weirton, W. Va. This mine is rounding out 21 years of continuous service near Florence, Washington County, Pa. The excavator was photographed recently on 62-ft overburden with a 33-cu-yd drag bucket. The twin hoist lines, each 477 ft long, are 2⅛ in. 6 x 41 improved plow steel, lang lay, IWRC. The twin draglines, each 285 ft in length, are 2⅝ in. 6 x 25 Type W, improved plow steel, lang lay, IWRC. Despite long and hard usage, both types of Bethlehem rope have been providing excellent service—the kind that gets the job done at the lowest possible cost.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem Wire Rope

BETHLEHEM STEEL

B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

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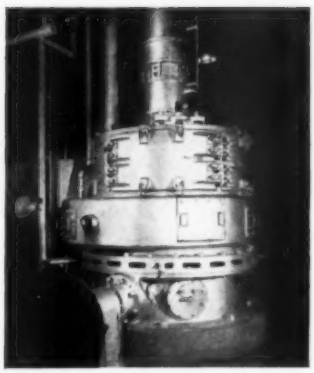
Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.



B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

DENVER

Peripheral Discharge MILLS

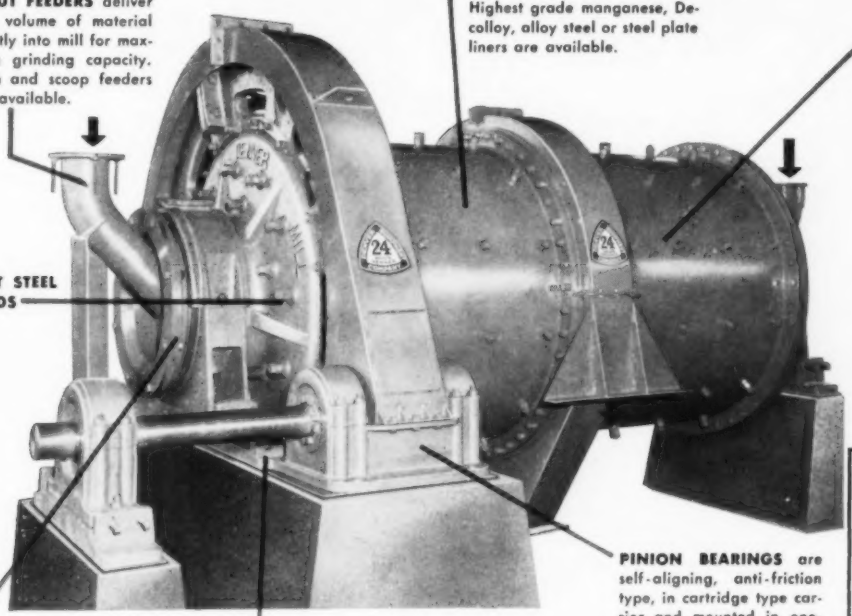
...turn waste or surplus stone into sharp, clean SPECIFICATION SAND— *simple, easy and profitable!*

COMPARE these Distinctive Features

SPOUT FEEDERS deliver high volume of material directly into mill for maximum grinding capacity. Drum and scoop feeders also available.

MANGANESE STEEL LINERS. Highest grade manganese, Decolloy, alloy steel or steel plate liners are available.

GREATER CAPACITY since both mill diameter and length are measured *inside* of *new* liners (rather than inside the shell).



CAST STEEL HEADS

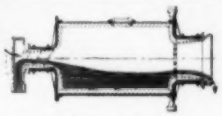
INVESTIGATE OUR LEASE-PURCHASE PLAN

SELF-ALIGNING TRUNNION BEARINGS on large mills are continuously lubricated from oil reservoir in base.

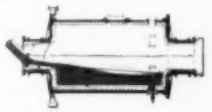
ADJUSTABLE, SINGLE-UNIT SOLE PLATE under trunnion and drive pinions assures perfect, permanent gear alignment.

PINION BEARINGS are self-aligning, anti-friction type, in cartridge type carrier and mounted in one-piece housing.

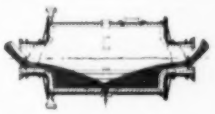
Sizes up to 10′ x 20′, small and large discharge



Medium or Large Trunnions with or without Grate Discharge



Direct Feed, End Peripheral Discharge



Direct Twin Feed, Center Peripheral Discharge

NO COST TO YOU FOR THIS SERVICE

Find out the exact size of mill you require, its cost, power requirements, production and screen analysis of manufactured sand. Send ¼ cu. yd. sample of material prepaid to Denver Testing Laboratory, 1755 Blake St., Denver, Colo., for preliminary test. There is no charge to you for this service and the information from this test will help you in your decision.

Let us report to you which method of discharge will do the best job for you.

"The firm that makes its friends happier, healthier and wealthier"

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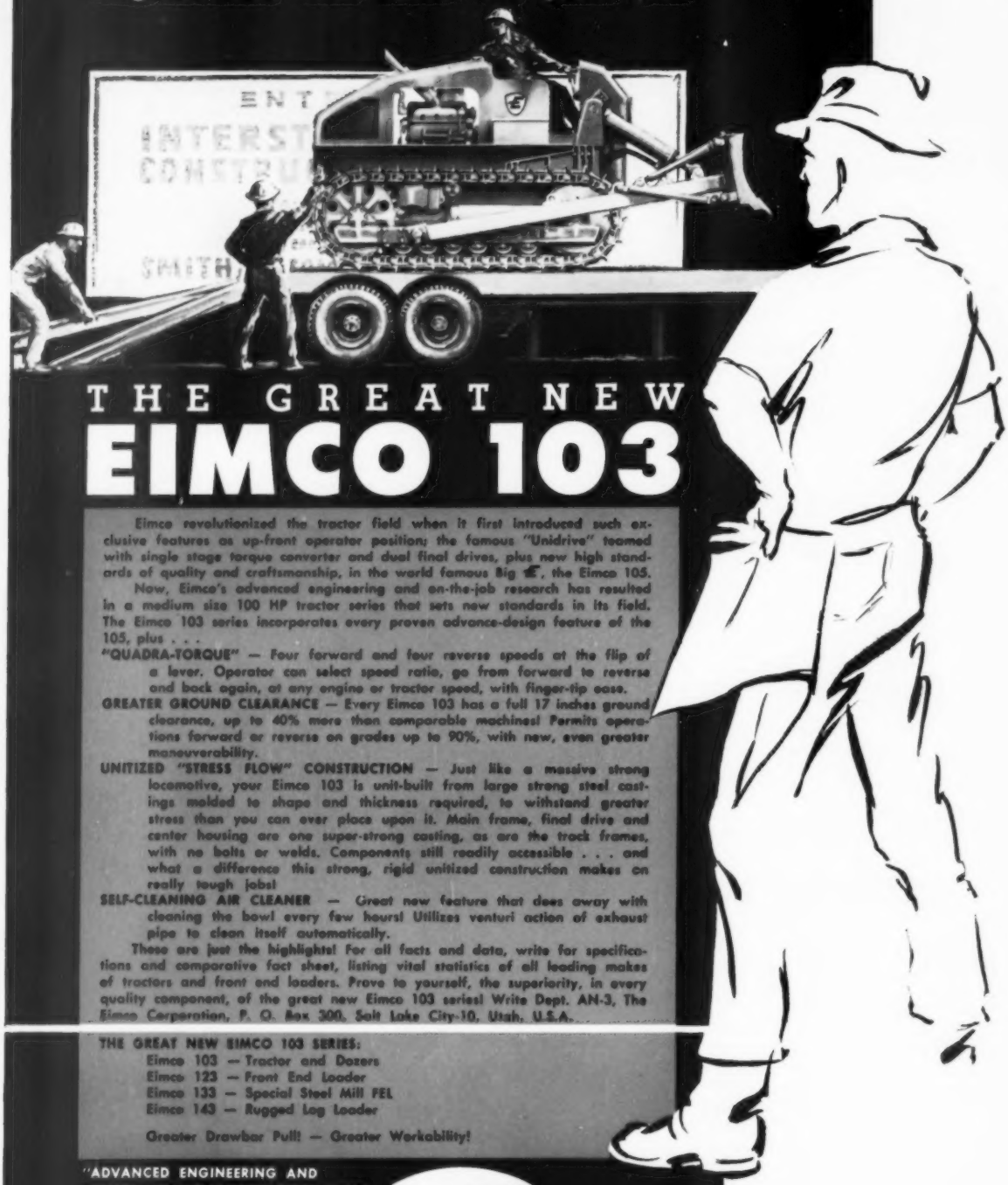

THE GREAT NEW

EIMCO 103

Eimco revolutionized the tractor field when it first introduced such exclusive features as up-front operator position; the famous "Unidrive" teamed with single stage torque converter and dual final drives, plus new high standards of quality and craftsmanship, in the world famous Big E, the Eimco 105.

Now, Eimco's advanced engineering and on-the-job research has resulted in a medium size 100 HP tractor series that sets new standards in its field. The Eimco 103 series incorporates every proven advance-design feature of the 105, plus . . .

"QUADRA-TORQUE" — Four forward and four reverse speeds at the flip of a lever. Operator can select speed ratio, go from forward to reverse and back again, at any engine or tractor speed, with finger-tip ease.

GREATER GROUND CLEARANCE — Every Eimco 103 has a full 17 inches ground clearance, up to 40% more than comparable machines! Permits operations forward or reverse on grades up to 90%, with new, even greater manouverability.

UNITIZED "STRESS FLOW" CONSTRUCTION — Just like a massive strong locomotive, your Eimco 103 is unit-built from large strong steel castings molded to shape and thickness required, to withstand greater stress than you can ever place upon it. Main frame, final drive and center housing are one super-strong casting, as are the track frames, with no bolts or welds. Components still readily accessible . . . and what a difference this strong, rigid unitized construction makes on really tough jobs!

SELF-CLEANING AIR CLEANER — Great new feature that does away with cleaning the bowl every few hours! Utilizes venturi action of exhaust pipe to clean itself automatically.

These are just the highlights! For all facts and data, write for specifications and comparative fact sheet, listing vital statistics of all leading makes of tractors and front end loaders. Prove to yourself, the superiority, in every quality component, of the great new Eimco 103 series! Write Dept. AN-3, The Eimco Corporation, P. O. Box 300, Salt Lake City-10, Utah, U.S.A.

THE GREAT NEW EIMCO 103 SERIES:

Eimco 103 — Tractor and Dozers
Eimco 123 — Front End Loader
Eimco 133 — Special Steel Mill FEL
Eimco 143 — Rugged Log Loader

Greater Drawbar Pull! — Greater Workability!

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